FLIGHT
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Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list:—

1927

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May 31 .... Airship Club Annual General Meeting.
June 2 .... R.A.F. Middle East Reunion Dinner (Trocadero)
June 4–6 .... Bournemouth Whitsun Air Races.
June 4–16.... Fourth International Aero Exhibition, Prague.
June 11 .... Newcastle Aero Club Flying Meeting
June 18 .... Inst.Ae.S. Visit to Croydon Aerodrome.
June 30 .... Inst.Ae.E. Aviation Ball at May Fair Hotel
July 2 .... Royal Air Force Display.

EDITORIAL COMMENT.

NOT since 1919 has public attention in this country been attracted to flying to the same extent as during these last few days. Everybody has been talking aviation, and everybody has followed breathlessly the progress of the two machines which have been making history, the one across the Atlantic Ocean and the other across Europe and a large slice of the East. By their flight from Cranwell to the Persian Gulf, Lieutenants Carr and Gillman have demonstrated a fact which probably the world generally was beginning to doubt, namely, that British aircraft and aero engines are capable of long-distance non-stop flights which compare favourably with anything previously done. Capt. Lindbergh has demonstrated several things, but first and foremost that it is possible for one man to do the piloting and navigation of an aeroplane across vast stretches of sea, and to keep awake for more hours than most people have thought possible under such conditions. It is, we think, generally considered that Capt. Lindbergh's flight was a foolhardy undertaking, but then, have we not ever admired and applauded foolhardy deeds? Foolhardy and courageous at least are closely related, and is not the British Empire, and most of the world as we know it today, for the matter of that, a result of a series of just such foolhardy deeds? The early explorers who set out to discover new worlds were every bit as foolhardy. Put in another way, and one which we personally prefer, Capt. Lindbergh, in his lonely flight from New York to Paris, gave proof of a courage, a determination and an endurance which none of the early explorers ever exceeded. But then he comes of the same Viking stock as did Erick the Red who, one may assume, must have traversed very much the same route as that followed by Lindbergh, although in the opposite direction. There is a certain romantic attraction in picturing these two adventurers. The one crawling slowly across the North Atlantic in a cockleshell of a boat, the other, alone, in the latest craft devised by

Two Great Adventures

man, moving at a speed probably something like ten times the best Eric the Red was able to get out of his boat. Small wonder that Lindbergh's flight has stirred the imagination of the whole world. Small wonder that he is being fêted and idolised. He richly deserves it.

After any great flight, such as the two made during the last few days, there are always those who say: "Yes, very excellent, but what is the use?" Now that is a perfectly natural question, but unfortunately it is one which, like so many apparently obvious things, is not very easy to answer. The two flights have so many uses, direct and indirect, the nature and value of which is somewhat difficult to explain to those not already familiar with aviation. Of the indirect values perhaps the most important is that it makes people talk aviation. In other words, it tends to make people "air-minded." When the man in the street discovers that modern aeroplanes are now able to cover nearly 4,000 miles without alighting, he begins to think that after all "there may be something in it." And once he gets to that stage, he becomes curious; he begins to ask questions; in other words, he begins to learn something about flying and flying machines. He begins to take them for granted, and to realise that the possibilities of flying do, perhaps, after all go beyond military aims and objects. The value of that alone can scarcely be exaggerated.

Technically the two flights have without a doubt been of very great value. To take the flight from Cranwell to beyond Bander Abbas. Does it not seem evident that the Royal Air Force, several squadrons of which are equipped with the Hawker "Horsley" day bomber, will feel all the more confidence in a machine which has been shown to be able to get into the air with very nearly twice the loaded weight of the standard service machine, and to remain in the air for more than 34 hours? Does not the fact that its "Condor" engine has been shown capable of running for that length of time, the first 10 or 12 hours of it at nearly full throttle, inspire confidence? We think the answer to both must be an emphatic yes. And nothing could be more calculated to improve the work of a flying service than implicit faith in its equipment. For that reason the flight of Carr and Gillman, although Karachi was not reached, as had been hoped, will, we feel sure, have done much towards increasing the regard in which the machine is already held in the R.A.F. What was the cause of the descent in the sea is not yet known, but we may be sure that it was nothing which need shake the confidence in the machine or its engine, and we may be equally sure that the flight has taught Carr and Gillman many useful lessons, lessons which will ultimately be to the benefit of the Royal Air Force as a whole.

In the case of the Atlantic flight, the outstanding technical lesson would seem to be the proof which the flight has provided of the high state of reliability reached by the Wright "Whirlwind" engine. To have three such flights to its credit as that to the North Pole and back, the world's duration record of 51 hours 11 minutes, and the Trans-Atlantic, is a record of which any firm may well be proud, and after these flights it will be difficult for anyone to deny that the radial air-cooled engine has now reached a stage of development where it need not fear comparison with water-cooled engines.

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Cairo-Cape-Cairo

In our admiration for the two long-distance non-stop flights we should not lose sight of the value of another meritorious flight, which has terminated successfully during these eventful days of May. The R.A.F. flight of four Fairey III F machines, with Napier "Lion" engines, from Cairo to the Cape and back to Cairo, although perhaps less spectacular than the two non-stop flights, was certainly not less useful. Undertaken as a piece of ordinary Service training, under Air Commodore C. R. Samson, C.M.G., D.S.O., A.F.C., chief staff officer of the R.A.F. Middle East Command, the flight was calculated to afford many opportunities for discovering weak points in machines and engines. Yet so far as is known, no trouble of any sort has been experienced. In view of the fact that the Fairey III F is a comparatively new type, this must be very gratifying to the makers of the machines. As for the Napier "Lions" with which the four machines were fitted, this engine has already more than proved its worth, and so the flight could do little more than confirm a well-established reputation. In this connection it is worth while recalling that four "Lions" did the Cairo-Cape-Cairo-England flight last year. Thus twice four of these engines have successfully come through a strenuous test. In a flight by a single machine, luck may play a certain part. When, however, eight separate machines and engines get through without trouble, the element of luck is reduced pretty well to vanishing point, and the demonstration becomes very convincing.

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THE ROYAL TOURNAMENT

OPENING last week, this great annual event will continue to entertain at Olympia daily at 2.30 and 8 p.m., until Saturday, June 4. This year, in giving value for money, the organisers of the Tournament have surpassed themselves. It would be difficult to make the daily programmes more attractive than with the feast of amusement and thrills which follow one another without a halt. Whether it is our old friend, the Royal Naval and Royal Marine Inter-Port Field Gun Competition, the Musical Ride of the Royal Horse Guards, the Display of Drill by the Royal Marines or one of the many other attractive items which are staged, each and every one simply "holds" the audience. Very near to *our* heart, not perhaps unnaturally is the Physical Training Display by the Royal Air Force. Some 136, in pale blue singlets and white shorts, take part in this positively perfect example of a body of men moving in unison—at times "community singing" being added during their evolutions. This turn is very original and very beautiful with its rhythmic movements to the music, the finale taking the form of a human grouping to form the initials R.A.F. In the mounted section, the mounted display by the Royal Dragoons is outstanding, particularly pleasing being the rein-less, bare-back and crossed arms exhibition by a section of the corps. Another item which is superb, and a credit to both man and beast, is the Musical Drive by "M" Battery, Royal Horse Artillery. On the lighter side will be found Trick Riding by the 16/5th Lancers, disguised as Arabs, weird and wonderful, a veritable circus in itself. This "diversion" is not only a highly humorous interlude, but calls for the greatest dexterity in accomplishing the many difficult items of trick riding—not forgetting the frisky hyena specially imported—the whole conception being the work of a great humorist. With the presentation of the Grand Pageant, "Scotland"—have there ever been so many pipers gathered together before?—comes the climax. Altogether one of the most wonderful entertainments ever staged at Olympia, and remarkable to relate, throughout it is equally attractive to juniors and elders. Upon its merits there should never be a vacant seat at Olympia until it closes on June 4, much less so when one remembers that the proceeds go to service charities.

"Flight" *Photographs*

THE FLIGHT TOWARDS INDIA : Three photographs of the Hawker "Horsley" in flight, piloted by Lieut. Bulman, during tests at Brooklands.

THE FLIGHT TOWARDS INDIA

Carr and Gillman Cover 3,419 Miles

IT is now nearly eight years since the late Sir John Alcock and Sir Arthur Whitten-Brown established their memorable record by a flight across the Atlantic from St. Johns, Newfoundland, to Clifden in Ireland, a distance of approximately 1,900 miles, which was covered in the Vickers "Vimy" with two Rolls-Royce engines, in just over 16 hrs. flying time. That, incidentally, was the last British distance record without alighting, and in connection with the R.A.F. flight from Cranwell, Lincs., to the Persian Gulf, just carried out by Flight-Lieuts. Carr and Gillman in a Hawker "Horsley" with Rolls-Royce "Condor" engine, it is of interest to note that the distance covered without alighting was very nearly double that of the "Vimy" made in 1919. Thus it may justly be claimed that in the intervening years there has been very substantial technical progress.

The wonderful flight which Carr and Gillman have just made ended, it is true, somewhat disappointingly, but one should be careful not to underrate their achievement. Let it be realised that this was the first time in eight years that we in this country have had any experience of flights of this nature, while other nations have been busy making long-distance non-stop flights. Had it not been for the fact that it had become generally known that it was the intention of Carr and Gillman to reach Karachi, and had not Captain Lindbergh made his daring and spectacular flight across the Atlantic at exactly the same time, everybody would have been unanimous in hailing Carr and Gillman's flight as a very wonderful performance. And so it was. The fact that at the very first attempt, these two gallant R.A.F. officers were able to beat by 75 miles or so the existing world's record for a non-stop flight without refuelling, should give us cause for satisfaction. That they were not entirely successful in accomplishing the task which they had set themselves is, of course, to be regretted, but there is not the slightest need to be downhearted about it. They did very well indeed, and there is every reason for believing that should they make a second attempt, they will have a good chance to beat by a considerable margin the record set up by Lindbergh. The flight, it should be kept in mind, was purely a service undertaking, carried out by R.A.F. personnel and on a service type of machine. Except for the large tanks fitted, the "Horsley" was a standard service machine of the day-bomber type.

The Start of the Flight

It had originally been intended that the start of the flight towards India should be made on the morning of Monday, May 16, but on that morning the wind at Cranwell aerodrome was blowing from the south-west, while a west wind was necessary so as to get the longest run. The Cranwell aerodrome is of large area, but by no means all of its surface is smooth, and a machine weighing more than 14,000 lbs. is not to be trifled with in the matter of starting. Consequently, it was decided as an unalterable rule that the start should only be made when the wind was blowing either due west or due east. In addition to fulfilling this condition, it was equally desirable that the weather conditions over the route generally should be favourable. How necessary this was will be realised when it is pointed out that a following wind of only 10 miles per hour for 45 hours would have added 450 miles to the distance covered in that time. A head wind of the same magnitude would have shortened the distance by the same amount. It was, therefore, small wonder that a delay of some days took place. Each morning Carr and Gillman, and a number of Air Ministry officials and representatives of the press, turned up at Cranwell, looked at the wind indicator, consulted the meteorological office, shook their heads and waited patiently for the wind to change. The delay must have been very trying to Carr and Gillman, but, fortunately, they resisted the very great temptation to "chance it" and abided by their original decision to wait for the right wind.

At last, on the morning of Friday, May 20, the wind indicator on the "Horsley hangar" showed the wind to be right, and the doors were quickly opened, the great machine wheeled out on to the tarmac in front of the hangar. The tanks had previously been filled up with their contents of 1,100 gallons of petrol, and nothing remained but to warm the Rolls-Royce "Condor" engine. After a few swings it fired and commenced its gentle purr. Suddenly there was a terrific bang, the starboard tyre had burst, and the petrol in the wing tanks began to spout out through the vents on top of the upper wing. Petrol poured down and for a few seconds considerable alarm was felt lest a fire should occur. However, the engine was stopped and the flow of petrol stanched. A new wheel was quickly fitted and the tanks "topped up" to their full capacity again. After warming up the engine,

"FLIGHT" *Photograph*

HOLDERS OF THE WORLD'S DISTANCE RECORD FOR TWO HOURS: Flight-Lieutenants Carr and Gillman, who made the non-stop flight of 3,419 miles, from Cranwell to past Bander Abbas, in the Persian Gulf.

"FLIGHT" *Photographs*

THE FLIGHT TOWARDS INDIA : Bringing the Hawker "Horsley" out of its hangar at Grantham on the morning of the start, and wheeling it towards the aerodrome.

Flight-Lieut. Bulman taxied the machine out to the starting point, the wheels standing up well this time. To make quite sure, however, a new pair of wheels were fitted before the actual start, and Carr and Gillman climbed into the machine.

A brief good-bye, a waving of hands, and Carr opened the "Condor" wide! The large machine slowly commenced to gather way, when suddenly it was discovered that the wind indicator on the hangar had veered several points towards the South-west! What would Carr do? Would he chance the diagonal wind, or would he swing slightly towards the left? It is not too much to say that every man on the aerodrome had his heart in his throat. It was a critical moment, and Carr had but a split second in which to make up his mind. Almost immediately it became evident that he had decided to swing into the wind and chance the rough ground ahead of him. The great machine was slowly gathering speed, the engine was kept at full throttle, and a slight incline was ahead, terminating in a shallow gully with an upward slope on its far side. The machine partly disappeared from view in the dip, only its top plane being visible from where the onlookers stood. Suddenly the machine bounced 20 ft. into the air! What would happen? Would it remain air-borne, or would it sink to the ground again? In an agony of suspense we watched it sink slowly. Ahead was a low wall marking the boundary of the aerodrome. Unless the machine could be persuaded to lift, the undercarriage would strike the wall, and disaster would be inevitable, the machine having by this time got up to a speed of probably in the neighbourhood of 100 m.p.h. Gradually the descent stopped; then the machine began to rise slowly, and at last it cleared the wall by several feet. A great cheer went up, partly as a tribute to a piece of daring and skilful piloting, and partly in the form of relief after a few moments of intense anxiety. What a start! The time was 9.38 a.m. G.M.T.

Almost as soon as he had left the aerodrome Carr commenced a gentle left-hand turn, and was soon lost sight of in the haze. Another "Horsley" had cruised around overhead before the start, and now took up a position as escort, joined later by two more "Horsleys" from Spittlegate. These

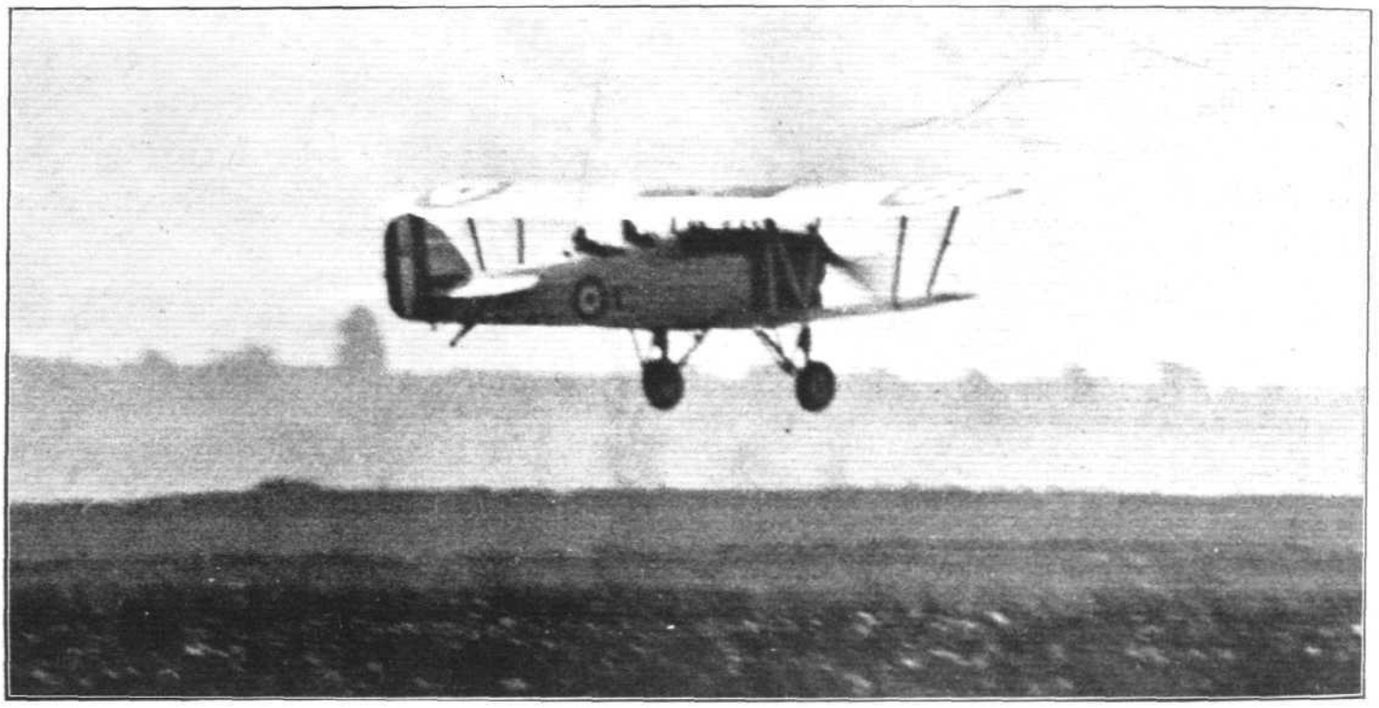
"FLIGHT" *Photograph*

THE FLIGHT TOWARDS INDIA : The Hawker "Horsley" being taxied across the aerodrome to the starting point, followed by interested onlookers.

three machines accompanied Carr and Gillman as far as Manston, Kent, the point where the India machine left the English coast. Here a flying-boat took over the escort, accompanying the long-distance machine as far as Ostend.

In the meantime, those on the aerodrome at Cranwell were busy examining the ground. The tail skid left the ground in 16 yards! The wheel tracks showed that by the time the machine reached the bottom of the gully it was all but airborne. Then came the point where the undercarriage struck the far slope of the gully. Here the wheels had made tracks at least 6 in. deep in the soil! No wonder the machine was bounced into the air. But the shock to the under-carriage must have been terrific, and it is rather a wonder that it did not collapse. That it withstood the load is a fine testimony to Hawker design and workmanship, and no less so to the quality of the Palmer wheels and tyres. The distance from the starting-point to the end of the tracks on the slope was found to be 792 yards, a very good take-off for such a heavily loaded machine. The time was stated to be 38 seconds, which seems very short, and points to very good acceleration in spite of the heavy load carried.

signals, which later attracted the steamer *Donax*, belonging to the Anglo-Persian Oil Co., whose captain, Capt. Armfield, took the aviators on board and proceeded with them to Abadan. As far as can be gathered at the moment, the time of alighting was 8.15 p.m. (Greenwich Mean Time) on Saturday, May 21, so that the machine had been in the air about 34½ hours. As the distance to the point where the machine alighted is a little over 3,400 miles, the average speed would be about 100 m.p.h. Actually, owing to the fact that Carr and Gillman did not follow the great-circle line, the distance flown must have been very considerably greater, but only the straight-line distance is credited in these record flights. The previous world's record was established last year by two French aviators, Costes and Rignot, who, flying a Breguet 19 *Sesquiplan*, covered the distance between Paris and Jask in the Persian Gulf, without alighting, a distance of 3,346 miles. Thus Carr and Gillman beat the French record, but they held it only for a couple of hours, when their performance was beaten by Capt. Lindbergh's flight from New York to Paris, a distance of about 3,600 miles. Whether or not the flight will ever be recognised as having constituted



"FLIGHT" *Photograph*

THE TENSEST MOMENT OF THE CRANWELL-BANDER ABBAS FLIGHT: The Hawker "Horsley" taking off from the Cranwell aerodrome. The start had to be made at an angle with the prepared course, owing to a change in the wind direction, and the machine was bumped into the air by the sloping side of a gully.

The End of the Flight

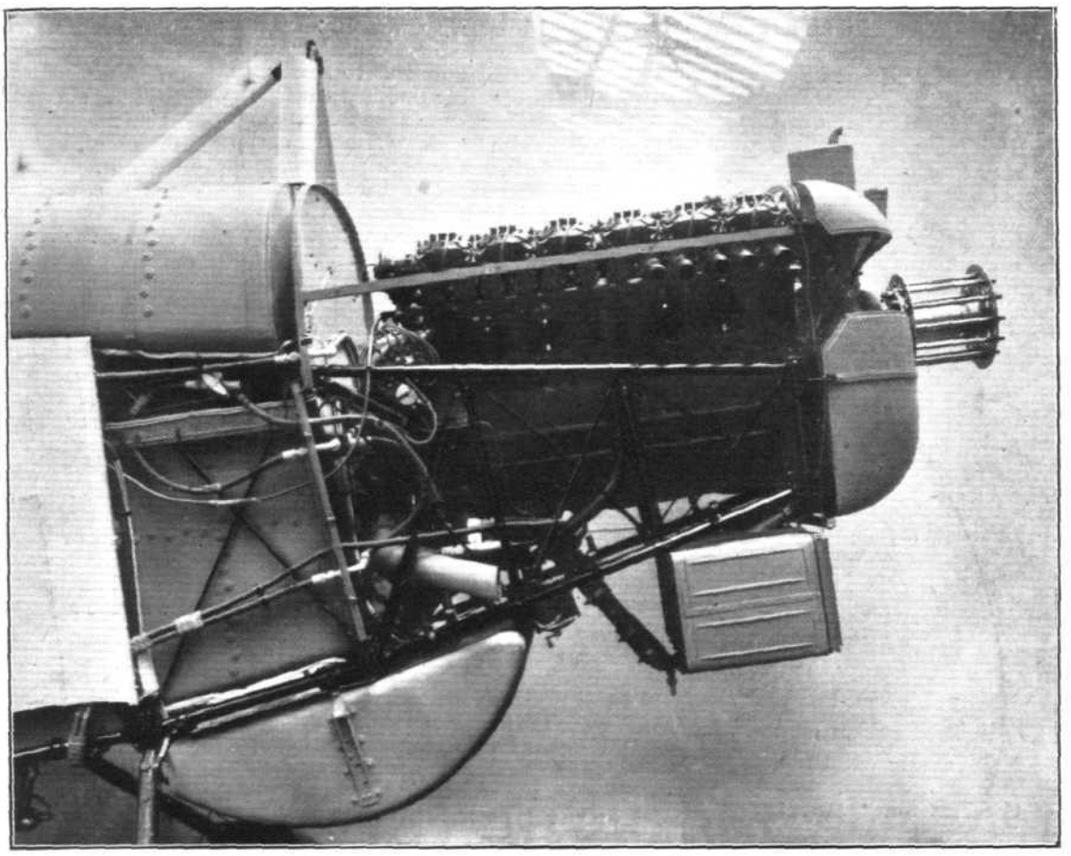
After being seen over Ostend, the India aeroplane was not heard of for many hours, until finally news came through that it had been observed in the neighbourhood of Wiesbaden. Then followed more than two days of suspense. Nowhere along its probable route did the "Horsley" appear to have been observed, but it was held that this was an occasion on which no news was good news, since had the machine been compelled to alight anywhere, word would almost certainly have reached this country very quickly.

Finally, on Sunday evening, May 22, the news was broadcast that a message from Simla stated that Carr and Gillman had been compelled to alight in the sea, some 45 miles south-east of Bander Abbas, had been rescued by the keeper of a light-house, and next day had been taken off by a steamer, the aeroplane being abandoned.

It was not until next day—Monday, May 23—that a few more details came to hand. It was then learned that Carr and Gillman had alighted in the sea some three miles from the Quoin Lighthouse, in the Straits of Ormuz, and 45 miles south-east of Bander Abbas. It appears that the machine overturned, and that Carr and Gillman were thrown out, having to swim back to the machine. In vain did they attempt to attract the attention of the lighthouse-keeper. It was not until daylight Sunday morning that they were seen and taken off by the keeper, who then hoisted distress

a record cannot be stated until it is known whether or not the registering barographs carried on board the "Horsley" were saved. If not, there is no proof (in the eyes of the F.A.I.) that the machine did not make a landing elsewhere, and presumably in that case the flight will not be officially homologated.

As to the cause of the forced descent in the sea, nothing definite is known at the moment of going to press with this week's issue of FLIGHT. One report states that petrol shortage was the cause. This seems somewhat improbable. To begin with, the petrol tanks were, needless to say, provided with gauges, and Carr and Gillman would certainly not have proceeded down the Persian Gulf had they had any indication that their petrol supply was running low. In that case they would have alighted at Bander Abbas. The fact that they came down in the sea points to the trouble, whatever it was, having arisen suddenly. Petrol shortage would have become evident much earlier, and moreover, unless one of the tanks had sprung a leak, would point to a petrol consumption nearly 50 per cent. greater than that of which the engine was known to be capable. There is a possibility that an air lock in the petrol system may have caused the engine to stop, but again this is unlikely, since by the time the aviators got as far as Bander Abbas they would be flying on the petrol in the wing tanks, from which there would be a good head of petrol and direct gravity feed. It is,



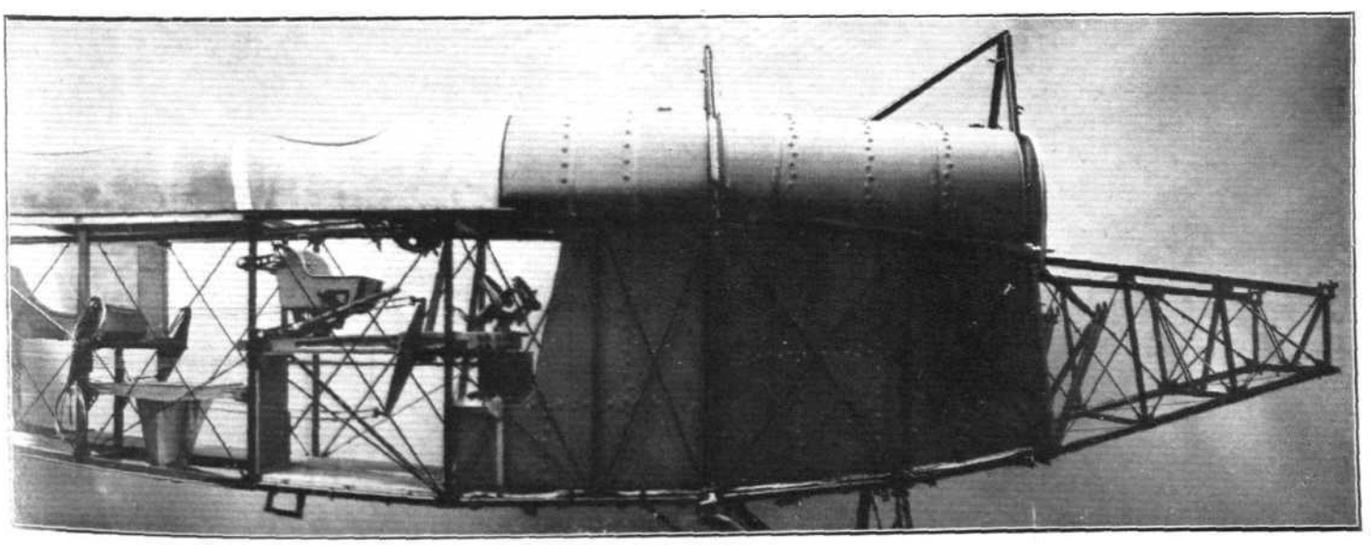
A Responsible Position: The Rolls-Royce "Condor III" engine, as installed in the Hawker "Horsley"

however, idle to speculate upon possible causes. Probably the explanation will be known in time to be announced in next week's issue of FLIGHT. In the meantime one can only congratulate Carr and Gillman upon their splendid flight, and sympathise with them in their disappointment at not reaching Karachi.

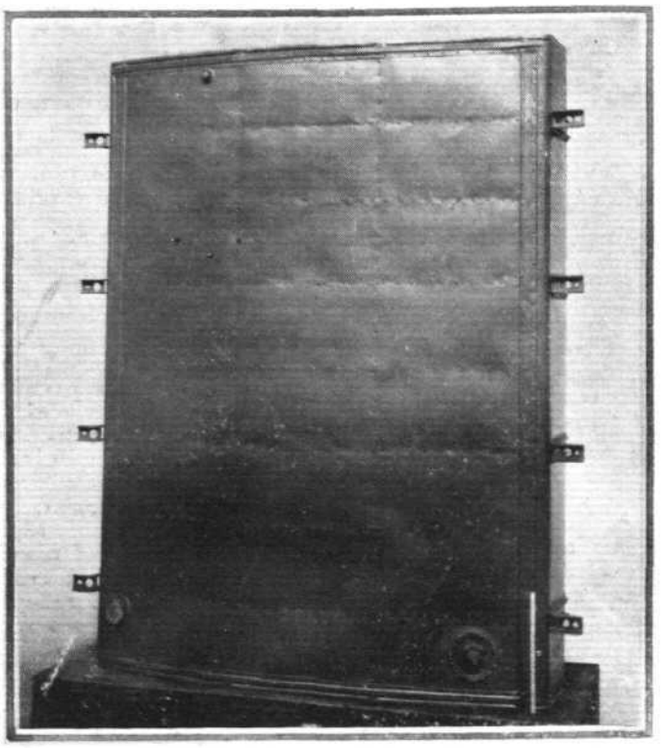
Marshal of the R.A.F., Sir Hugh Trenchard, Chief of the Air Staff, sent the following telegram to Carr and Gillman :— "Delighted to hear of your safety, and congratulate you on your splendid flight. Sorry you were not able to reach your goal."

HISTORY OF THE FLIGHT

It is of interest to record briefly the history of the England-India flight. The idea originated, we believe, with Marshal of the Royal Air Force, Sir Hugh Trenchard, Bart., G.C.B., D.S.O., Chief of the Air Staff. For a time there was some doubt as to whether there was available a service type of machine capable of carrying the necessary load, and the scheme was almost abandoned when it was brought to the notice of Mr. T. O. M. Sopwith, one of the earliest of British aircraft constructors. Mr. Sopwith immediately realised that he had, in the Hawker "Horsley" a machine which suitably modified as to fuel tank capacity, etc., should stand a very good chance of beating the existing world's record for distance in a straight line without alighting and without refuelling during flight. Under his supervision, and with the assistance of the Air Ministry, a service type "Horsley" was got ready for experimental flights, lead and other ballast being carried to represent the heavy overload of petrol that would have to be carried in order to make the flight possible. On this test machine Flight-Lieut. P. W. S. Bulman, the famous Hawker test pilot, carried out a series of flights, partly to determine the get-off qualities of the machine with a heavy overload, and partly to experiment with carburation in order to get the most economical petrol consumption possible. The series of tests were successful in both respects, the "Horsley" repeatedly getting out of Brooklands with a total loaded weight of considerably more than 9,000 lbs., *and at half-throttle!* By systematic testing and experimenting the petrol consumption was gradually reduced to rather less than 20 gallons per hour, and the smallest possible consumption on which the machine would remain in the air was a good deal less than that, although to have a



FUSELAGE OF THE HAWKER "HORSLEY": This view shows the seating accommodation, tanks and engine mounting. Three more petrol tanks were housed in the top plane, giving a total petrol capacity of 1,100 gallons



The centre-section tank of the Hawker "Horsley."

useful speed a consumption of somewhere in the neighbourhood of 20 gallons was required.

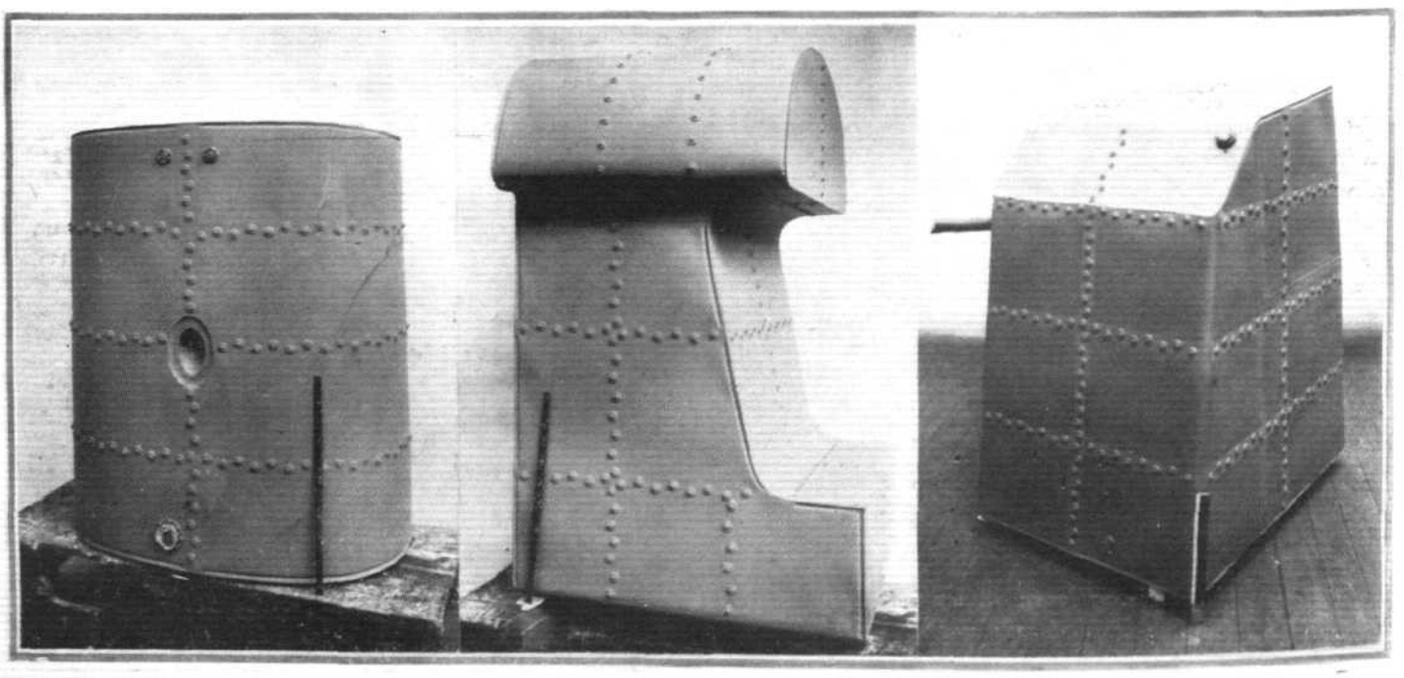
This much having been proved, it remained for Mr. Sydney Camm to carry out stress calculations of the aeroplane structure so as to determine whether the machine would have reasonably high load factors with the terrific weight that had to be carried. Stress estimates proved this to be the case, the machine being quite safe with a total loaded weight of 14,200 lbs.

Sir Hugh Trenchard and Sir John Higgins forthwith decided that the attempt should be made, and work on the modified machine was at once commenced. The problem of how to house more than 1,000 gallons of petrol without spoiling the lines of the machine was a very difficult one. A number of external tanks would offer a great deal of extra head resistance, and for a machine to be able to cover long distances aerodynamic efficiency is an essential condition. At the very outset, therefore, it was decided that whatever happened, the machine was to be kept clean." The views of the actual machine published in the present issue, as well as those which we gave last week, show that this resolution was rigidly adhered to. With the exception of the oil tank, slung underneath the nose just behind the radiator, not a single excrescence was added due to the extra fuel tanks. In fact, the only objects added externally were a compass on top of the fuselage and brackets on the sides of the rear cockpit for the drift indicator.

The first test flight of the actual machine was made about a month ago, and everything was found to be in order. A good deal of testing was still required, however, and Flight-Lieutenant Bulman was hard at work for a while. These tests included full-load taxying across the aerodrome at Brooklands, a severe test for the undercarriage. The Palmer wheels and tyres stood the tests well, although later on, while the machine was standing in the shed, a tyre burst. It will be realised that the problem of designing wheels and tyres to carry a load of, roughly, 7,000 lbs. each, is no easy one, especially since factors of safety capable of taking care of the shocks to be encountered during taxying over more or less rough ground have to be attained. As usual, however, Palmers proved equal to the occasion, and the "Horsley" got out of Cranwell Aerodrome without damage in the actual take-off.

The Machine

IT will probably be known to the majority of our readers that the Hawker "Horsley," designed and built by the H. G. Hawker Engineering Company, of Kingston-on-Thames, of which Mr. T. O. M. Sopwith and Mr. F. Sigrist are managing directors, is the standard day-bomber of the Royal Air Force. The service type is fitted with the Rolls-Royce "Condor" engine of 650 h.p. The design of the machine is somewhat unusual, and is characterised by a biplane cellule of which the top plane has considerably greater span and chord than the bottom plane. The wing-bracing is of the two-bay type, with the undercarriage attached to the lower plane at the junction of the inner pair of inter-plane struts. This arrangement, in addition to providing a free space for a large bomb, or even a torpedo, has the advantage of giving a very wide wheel track, so that the machine is not easily overturned on the ground. The wing section is somewhat unusual. We have no exact information concerning it, but it appears to be one of, or a slight modification of one of, the German Göttingen "tadpole," or Schoukowsky sections, characterised by considerable depth near the leading edge, fining off to a very thin trailing edge with, however, a fairly pronounced mean camber. These sections have proved very efficient, with a good maximum L/D ratio and a reasonably high maximum lift coefficient. A feature of them is that the centre of pressure is fairly far back at normal flying angles



THE PETROL TANKS OF THE "HORSLEY": On the left, the deck fairing tank. In the centre, the aft fuselage tank, and on the right the front fuselage tank.

and it will be noted from the photographs that in the Hawker "Horsley" the rear wing spars are situated fairly far back in order to take care of the loads due to the rearward travel of the c.p. To those who like to make a study of aerodynamic design of aircraft, it is not without interest to note that the "Horsley" has very much the same general lines as the diminutive Hawker "Cygnet," which won the *Daily Mail* competition. There is the same large top plane and small lower plane. The fuselages are not dissimilar in shape, while the proportions of control surfaces are also somewhat alike. Altogether, one may say that the "Horsley" is the logical "big" version of the "Cygnet." It is rather remarkable to see such similarity between two machines, of which one weighs more than ten times as much as the other.

The engine installation of the standard service "Horsley" shows, externally, very clean lines, the water tank straddles the propeller shaft and forms a smooth rounded nose, while the radiator is underneath the fuselage. The *ensemble* gives a particularly clean flow for the slipstream, to which fact doubtless much of the efficiency of the "Horsley" is due. Structurally, the "Horsley" is of the mixed type of construction, with steel tube fuselage and wood wings, although all-metal wings can also be supplied.

To give an idea of what exactly was entailed in modifying a "Horsley" for the India flight, it may be of interest to point out that the standard petrol tankage is 230 gallons, which had to be increased to 1,100 gallons. The service type of machine normally carries 18 gallons of water for cooling the engine, while the long-distance machine carried 30 gallons. Standard oil capacity is 19 gallons, increased to 60 gallons in the record machine. Put in another way, the weight of fuel, oil and water in the case of the standard service type of machine is 2,116 lbs. The corresponding figure for the record machine is 8,600 lbs., of which the petrol alone accounts for 7,700 lbs.

The empty weight of the service type "Horsley" is 4,760 lbs. Owing to the weight of the extra tanks, etc., the empty weight of the India machine is 5,200 lbs. The normal full-load weight of the service machine is 7,800 lbs., and of the record machine 14,200 lbs. The wing area is the same in both cases, *i.e.*, 691 sq. ft., so that the standard wing loading is 11·13 lbs./sq. ft. In the record machine this was increased to 20·55 lbs./sq. ft. The standard and "special" power loading figures are 11·15 and 20·28 lbs./h.p. respectively, judged on the same nominal power of 700 h.p. Actually, however, we believe that the "Condor" of the India machine developed a maximum of nearly 800 h.p., in which case the actual power loading at the start from Cranwell would, of course, be 17·75 lbs./h.p.

The only structural departures from standard in the long-distance "Horsley" were stronger wheel axles and wheels, and a slight modification of the bracing of the top centre-section, the latter necessitated by the petrol tank fitted in the deck fairing. *In all other respects the India flight "Horsley" was identical as regards its stress-bearing structure, with the service type.*

The Petrol Tanks

As the greatest change in the machine relates to the petrol tanks, a few words concerning these may not be without interest. The 1,100 gallons of petrol are contained in seven tanks, of which three are in the fuselage, two in the top centre-section, and one on each side of this, in the outboard top wing sections. The wing tanks are of tinned steel, but the fuselage tanks are all of welded aluminium, as is also the oil tank slung under the front portion of the fuselage. Perhaps it was somewhat daring to use welded aluminium tanks for a performance like this, but tests and experiments

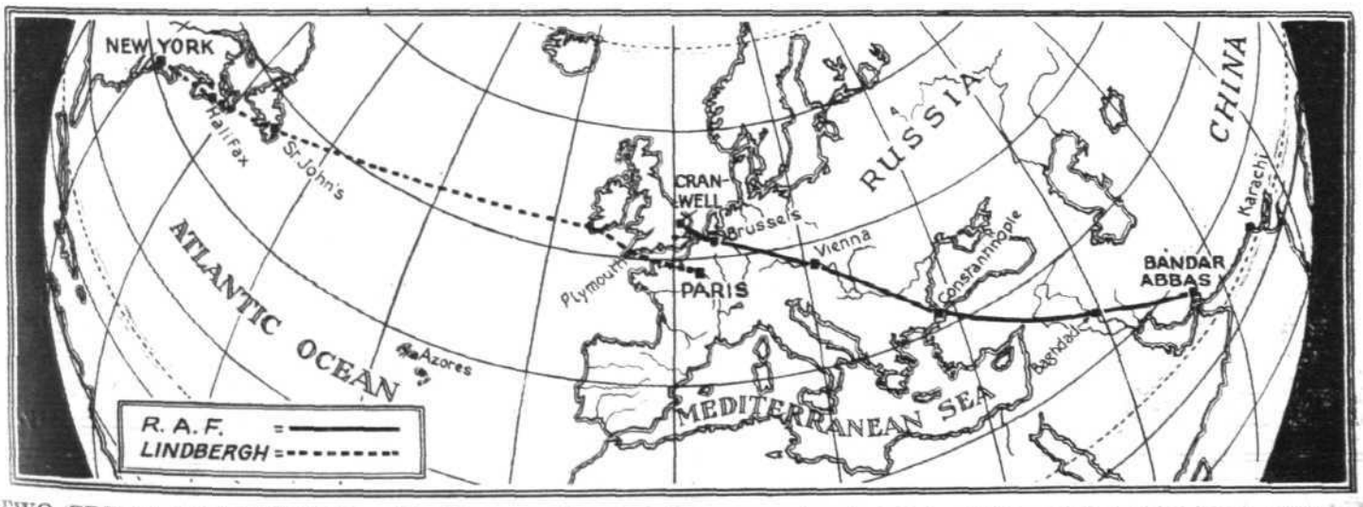
"FLIGHT" *Photograph*

THE PERSONAL EQUIPMENT: Mechanics carrying the parachutes and haversacks out to the machine.

indicated them to be satisfactory, and they were ultimately chosen and installed, without any ill-effects as far as can be discovered up till now. Needless to say, the large fuselage tanks are amply provided with baffle plates, and tie rods support the sides against bulging, the washers being clearly visible in the photographs of the tanks.

The Rolls Royce Engine

With the exception of special tuning for low fuel consumption, the Rolls-Royce "Condor Series III" engine is the standard type, a 12-cylinder water-cooled Vee of a normal power of 650 h.p. at a normal speed of 1,900 r.p.m., and a maximum permissible speed of 2,100 r.p.m. A single-spur reduction gear is fitted, the ratio of propeller speed to engine



TWO GREAT ADVENTURES: Sketch map showing the approximate routes followed by Carr and Gillman in their flight to the Persian Gulf, and Lindbergh in his flight across the Atlantic. The approximate great-circle distance of the British flight is 3,420 miles; that of the American 3,590 miles.

speed 25 to 43. The weight of the engine complete but without water is 1,374 lbs., and the bore and stroke are 5·5 ins. (140 mm.) and 7·5 ins. (190 mm.) respectively. The magnetos fitted are B.T.H. SV 12 A types, and the carburettors Claudel Hobson "Duplex" types. Actually it is believed that the compression ratio of the engine fitted in the long-distance "Horsley" is somewhat greater than normal, not so much with a view to the engine developing more power as in order to get lower fuel consumption when throttled down. The extra power resulting from the higher compression would, of course, be available for taking off. A special petrol mixture consisting of 50 per cent. of ordinary aviation spirit and 50 per cent. of a lighter petrol was used, with a small quantity of benzol and petrol mixture for use in taking off. To have lifted off the ground at Cranwell, under conditions that could by no means be described as ideal, the greatest weight of petrol ever pulled into the air by a heavier-than-air machine is a feat which reflects great credit on the Rolls-Royce engine, and to have kept running for 34½ hours, the first ten or twelve at somewhat near full throttle, is merely in keeping with the reputation of the firm whose engines carried British aircraft through the many famous long-distance flights of 1919, including the transatlantic, the London-Australia and the London-Cape flights. After this demonstration of reliability, the R.A.F. should have, if possible, still greater faith in the Hawker "Horsleys" and their "Condor" engines, the standard day-bomber equipment of the R.A.F.

Others who Contributed

So many parts go into a modern aeroplane, and so varied are the specialist firms supplying material that it would be impossible to mention all those who, directly or indirectly, helped to make the Cranwell-Bander Abbas flight possible. It may, however, be of interest to mention that, in addition to the firms already referred to, Smith and Sons supplied the instruments and K.L.G. plugs, Vickers, Ltd., the Reid turn indicator, which doubtless helped Gillman greatly in the task of navigating the machine, Cellon, Ltd., the dope with which the machine was coated, and the Airscrew Company, of Weybridge, the propeller which translated the engine-power into thrust. The steel-tube fuselage and other tubular parts of the "Horsley" were made from Accles and Pollock tubing, while aluminium fittings, aluminium tanks and other parts were made from material supplied by the British Aluminium Co. Duralumin parts were, of course, made from James Booth and Co.'s Duralumin, while the spruce spars started life on the Pacific coast of Canada and reached the Hawker Co. in the form of planks *via* L. Bamberger and Sons. Brown Brothers were responsible for all A.G.S. parts, while the petrol cocks (of which there were quite a few!) came from Benton and Stone's, and the petrol pipes from Hobdell, Way and Co. Finally, Auster windscreens protected Carr and Gillman against wind and weather, and the Irving parachutes were carried in order to enable the fliers to quit the machine in the air should this have become necessary.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

BOURNEMOUTH WHITSUNTIDE AIR RACES

THE Whitsuntide Air Race Meeting will be held at Ensbury Park Racecourse, Bournemouth, on Saturday and Whit Monday, June 4 and 6, 1927. Commencing each day at 2.30 p.m.

There will be eight races spread over the two days and the prizes amount to approximately £500.

Members of the Royal Aero Club will be admitted free to the Members' Enclosure and Paddock on production of their Membership Badges. There will be a charge of 2s. 6d. for motor cars.

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The AIRCRAFT ENGINEER

FLIGHT ENGINEERING SECTION

Edited by C. M. POULSEN

May 26, 1927

CONTENTS

EDITORIAL VIEWS

Just as we are going to press with the present issue of FLIGHT comes to hand from the Royal Aero Club particulars of the formula that is to be used as a basis for handicapping machines taking part in the race for the King's Cup, which is to be held at Bournemouth on July 30. The formula differs somewhat from that used last year, but owing to the recent arrival of the particulars, there has been no time for making an extensive study of the new formula, nor of the effect which it is likely to have on air racing.

The new formula for handicap purposes is as follows:—

$$V^3 = K \times 10^6 \times P/S^2$$

where V is the handicapping speed in miles per hour, K a coefficient the value of which is taken as 12 for all aeroplanes fitted with water-cooled engines, P is the brake horse-power of the "type" engine at "maximum permissible" revolutions per minute, and S is the "equivalent wing span" of the aeroplane in feet. For a monoplane the wing span is simply S.

In the case of a biplane with upper and lower wings of equal span S = 1.265 × (wing span). For a biplane in which the upper and lower wing spans are unequal, S is taken as = S_1 0·265 × S_2, where S_1 is the greater span and S_2 the lesser span.

For machines fitted with air-cooled engines (and probably these will form a majority), the value of K is determined according to a curve giving values of K ranging from 9·9 to 12·0 on a basis of P/S^2, the value of this ratio being 0 for K = 12, and 0·9 for K = 9·86. The curve is very nearly (but not quite) a straight line, and those who wish to try out the formula for themselves can easily plot it out. (Time has not permitted of getting a block made in time for this week's issue, but we shall publish it next week.) The curve is very slightly concave, *i.e.*, K = 10·96 corresponds to a P/S^2 of 0·4, so that a rough curve accurate enough to give an indication of how the formula will work can readily be prepared.

The formula used last year incorporated, it may be remembered, the "wing power," as defined by Prof. Everling in the article in THE AIRCRAFT ENGINEER of November 25, 1926, *i.e.*, horse-power per square foot of wing surface. The new formula, on the other hand, makes use of what may, perhaps, be termed "span power," since it relies on the horse-power per foot of wing span.

AIRCRAFT PERFORMANCE.

By J. D. NORTH, F.R.Ae.S.

(*Continued from page* 23.)

It has already been pointed out, in the issue of the AIRCRAFT ENGINEER dated March 25, 1926, p. 28, that the stream lines in the ideal fluid postulate negligible compressibility, and that in the case of high-speed airscrews, *e.g.*, tip speed greater than $V/V_c = 0·75$, attention must be given to the influence of the compressibility of the air on the flow round the blade section. Most readers will be familiar with the photographs which have been published on various occasions showing the pressure waves shed from a bullet moving at high velocity, and it is well known in external ballistics that the resistance of bullets and shells can be reduced by a fine run in the nose. In the case of shells and bullets moving at velocities in the order of twice the speed of sound, the shed of entry is naturally of extreme importance, but even at three-quarters of the speed of sound, the influence of compressibility is not negligible, and is aggravated by the fact that the sections are inclined at an attitude to the relative wind so as to produce lift.

The experimental determination of the characteristics of aerofoils at these high velocities is naturally one of extraordinary difficulty, two methods of attack being used: one, in the United States, by measuring the lift, drag and pressure distributions on an aerofoil in a jet moving at a very high velocity, but with a diameter considerably less than the aerofoil span (N.A.C.A. Reports 207 and 255); while at the Royal Aircraft Establishment, Farnborough, characteristics have been deduced from observations on full-scale propellers, and also on model propellers rotated at exceptionally high angular velocities (R. & M. 884). Detailed conclusions arrived at by a study of these experiments are not very consistent, which is not surprising when one takes into account the experimental difficulties and the differences of method. Both sets of experiments, however, *do* indicate a substantial fall off in lift/drag ratio with increase of V/V_c, particularly at higher lift coefficients.

Fig. 24 is taken from N.A.C.A. Report No. 207, and shows the polar diagrams for six aerofoils tested at speeds representing V/V_c from 0·5 to 0·9. The aerofoils from 1 to 6 are progressively thicker and, since they are "affine" sections, of progressively increasing centre line camber. It is, on account of this double variation, impossible to dissociate the influence of increasing thickness and increasing centre line curvature on the high-speed characteristics of these aerofoils. In the case of the thinnest and lowest camber aerofoil, it is notable that the profile drag is least affected at values of

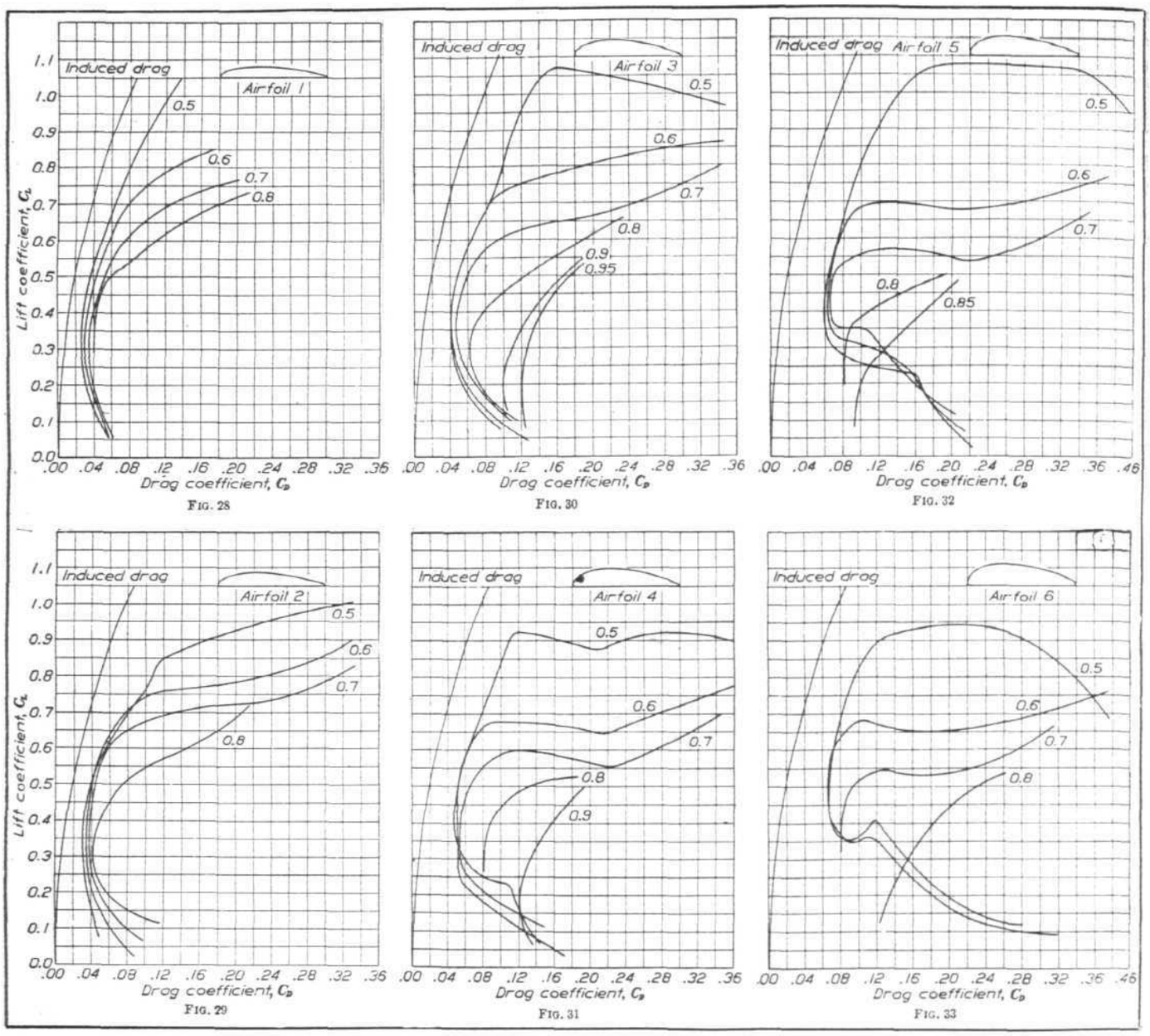


FIG. 28 FIG. 30 FIG. 32

FIG. 29 FIG. 31 FIG. 33

Fig. 24.

the lift coefficient less than that corresponding to the normal minimum profile drag. In the case of the thickest sections, the flow appears to break down completely.

The further tests on the same aerofoils carried out in N.A.C.A. 255 include the measurements of the pressure distributions across the median section. A sketch indicating the characteristic type of the change of pressure distribution with speed is given in Fig. 26, which represents aerofoil No. 1 at an incidence of 12° at values of V/V_c of 0·5 and 0·95 respectively. It will be seen that the low-pressure peak on the forward part of the upper surface is truncated at the higher speed with the result that the forward component up wind is reduced, and consequently the drag of the whole aerofoil tends to increase as the lift goes down. In other words not only is the total pressure reduced, but the type of pressure distribution is unfavourable to low drag.

Some observations by means of oil and threads were made qualitatively on the type of flow. The following abstract is typical of the results obtained :—

"A change in flow begins in a fairly sudden manner in the boundary layer on the upper surface immediately behind the maximum ordinate for thin airfoils at the lower speeds, and at the trailing edge for thick airfoils at the lower speeds. At the lower speeds the change takes place at comparatively large angles, and is analogous to the well-known burble point. At the higher speeds, the change takes place at small

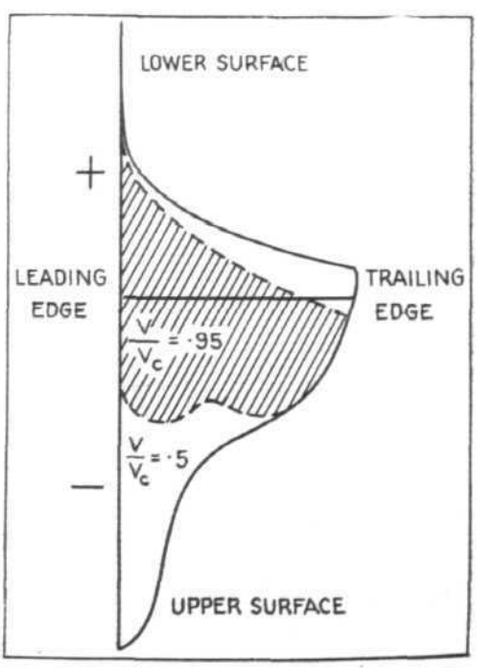


Fig. 26.

angles, and is accompanied by a rapid decrease in lift coefficient and increase in drag coefficient.

"At $V/c = 1 \cdot 08$, standing compressional waves (bow waves) were observed at a distance of about $0 \cdot 5$ in. in front of the leading edges of the airfoils."

In R. & M. 1040 Mr. H. Glauert, in empirical corrections on K_1 tip speed, states :—

"The corresponding correction to the drag coefficient is not known with any certainty, but it is relatively unimportant."

R. & M. 884, however, shows that a tip speed of $0 \cdot 85$ times the speed of a sound may reduce the efficiency of a low-pitch airscrew (that is, an airscrew suitable for a heavy bomber with an ungeared engine) from 75 to about 60 per cent. Both these reports, however, suggest increase in lift coefficient with increasing speed. N.A.C.A. Technical Note No. 244 shows that propeller sections tested at 1 and 20 atmospheres have, if anything, a lower lift coefficient at higher values of $\frac{Vl}{\nu}$, but in N.A.C.A. Report No. 220 the writer of the report suggests that the high full scale Kq may be due to scale effect on k_1. We have, therefore, both evidence and suggestions in favour of (a) higher and lower lift coefficients with increasing $\frac{Vl}{\nu}$, and increasing V/Vc, and also suggestions that increase of drag coefficient with V/Vc is negligible and evidence that it is very marked. The position is still further complicated by the fact that an integration of the drag components in N.A.C.A. 255 give a higher value to drag than that measured in N.A.C.A. 207. The authors of the former report comment as follows :—

"When we come to drag coefficients there is a somewhat different state of affairs. We should expect the drag coefficient computed from the pressure integration to be lower than the true drag coefficient because of skin friction. We might also expect the coefficient for a section near the centre to be somewhat lower than the average for the whole section. Hence, it is probable that the total drag coefficient for the whole section is greater by some unknown amount than that computed from the pressure distribution. However, the values computed from the pressure integration at Edgewood are very much higher than those obtained at Lynn at angles near 0°. We should expect the drag coefficient for the whole section to be somewhat higher than the Lynn values owing to the smaller aspect ratio, but the difference is too great to be attributed entirely to an aspect ratio effect. It seems highly probable that there is a comparatively large effect of Reynolds number on drag coefficient even at these high speeds. We hope to obtain more definite information on this point in later tests.

"The drag coefficient curves given in Report 207, Figs. 16 to 21, show a rapid rise in coefficient for angles near 0°, as, for example, Figs. 21 for airfoil 6. The maximum speeds reached in most cases were between $0 \cdot 8$ and $0 \cdot 95$, the speed of sound. The Edgewood tests show that this rapid increase is followed by a region of nearly constant coefficient, and in fact there is some indication of this in a few observations in Report 207. In other words, the drag curves are probably somewhat similar to the well-known Gavre curve for projectiles."

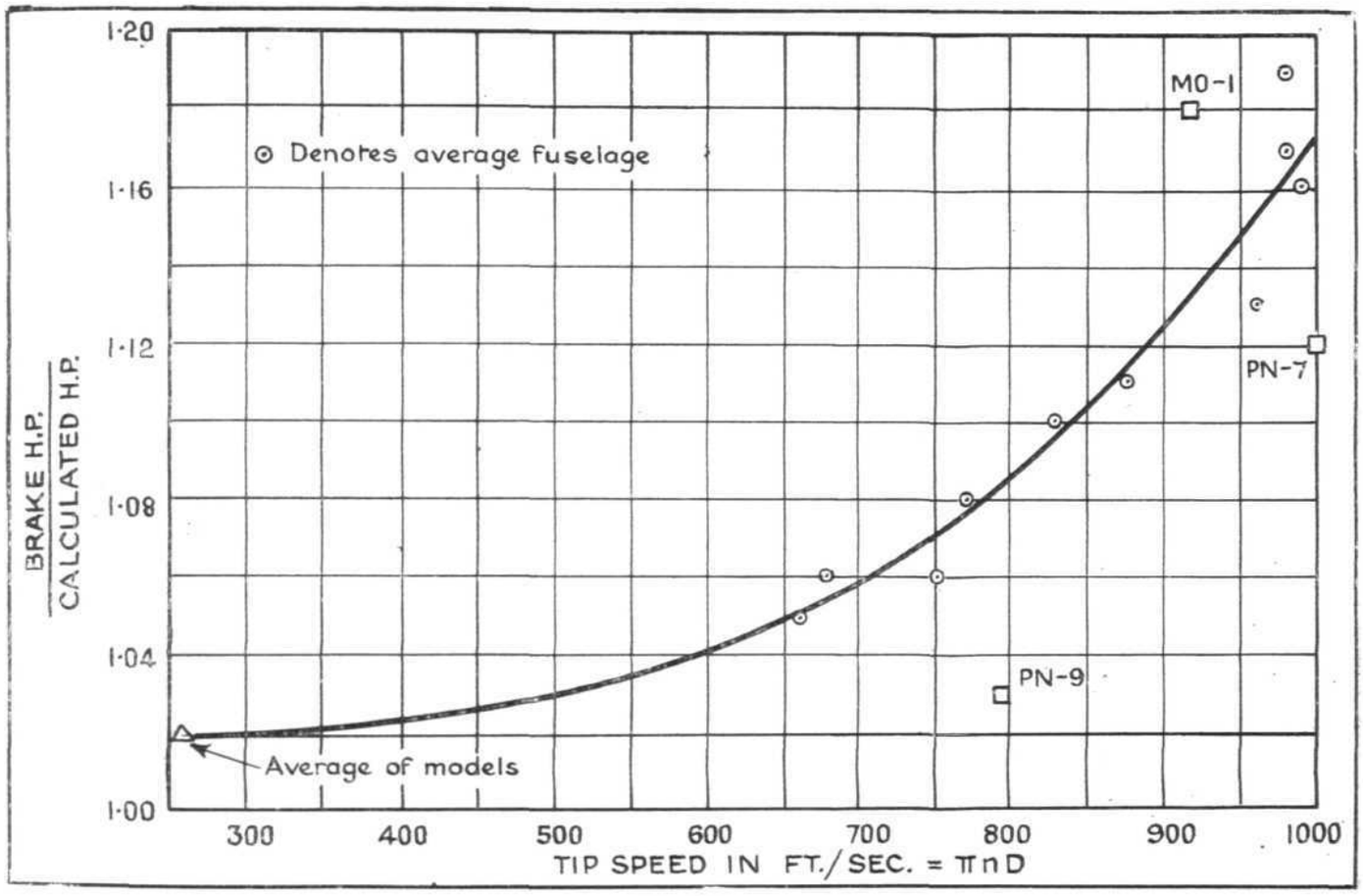


Fig. 25.

N.A.C.A. Technical Note No. 225 gives indirectly the increase of torque coefficient experimental over calculated for models and a number of actual aeroplanes plotted as the ratio of drag horse-power over calculated horse-power against tip speed. There is a notable departure from the normal curve in the case of the P.N. 9 multi-engine machine, and a not inconsiderable departure in the case of the P.N. 7 and the M.O.1. These are explained by the writer of that report as being due to abnormal body conditions, M.O. 1 having an exceptionally large fuselage and thick wings immediately behind the propeller, P.N. 7 and P.N. 9 having outboard engines with small nacelles, and the P.N. 9 large geared propellers. So far as the results up to 800 ft./sec. are concerned it would appear that the increase of Kq might be due as much to the relative sizes of the fuselages and the propellers as either scale effect or high value of V/Vc. It is unfortunate that comparisons between the calculated and actual thrust coefficient are not available for the same propellers.

The reader may well appreciate the difficulty of dissociating

the mutual effects of the body-propeller combination from those due to high tip speed. Again, however, the preponderating evidence in both cases suggests advantage for the slowly running propeller, or rather the propeller with the low value K (see AIRCRAFT ENGINEER, March 31, 1927).

So far as the actual effect of very high velocities on the performance of aerofoil sections are concerned, there is a suggestion that the adverse effects of these high speeds on the aerofoil characteristics may be mitigated by the use of thin aerofoils with fine run entries at small lift co-efficients or small angles of incidence; the aerofoils should also be of low camber. These requirements can, unfortunately, only be realised in part of an airscrew which is to work over a speed range. It is owing to the constructional difficulty of providing such thin sections that the solid metal propeller appears to have a *prima facie* advantage over the wooden propeller; but when the wooden propeller is designed to the best possible advantage for high speed conditions, the difference between the wooden and metal propeller is very much less than might be expected. It is true that the comparison of a bad wooden propeller with a solid metal propeller might show a great improvement in performance in favour of the latter, but the writer believes that there are no sound evidential grounds for saying that a metal propeller can be made to obviate even in a moderate degree the bad effects on efficiency of very high tip speeds, or even that there is any sound evidence that a metal propeller can necessarily be made more efficient than a wooden one.

We may now turn to the question of the increase of drag of body on the slipstream. The results of some important experiments have been published in R. & M. 830 and R. & M. 1030. The usual mode of expressing the influence of the airscrew on the body is as R/R_c, that is the ratio of the drag of the body in the slipstream to the free air drag without airscrew, and this ratio is generally expressed in the form $A + B T_c$ the thrust co-efficient being, of course, associated with the relative velocity of the slipstream and free air $T_c = T/pV^2 D^2$.

In R. & M. 830 the bodies were large in relation to the airscrew, varying from 0·4 to 0·75 of the airscrew diameter and the bodies were a poor shape having a long parallel centre portion, a very blunt nose, but no sort of excrescences. Values of A and B were startlingly high, between 1 and 1·8: for A, and up to as much as 12 with B. It was suggested by McKinnon Wood that some part of the high value of the B constant might be due to the change in pressure along the slipstream due to its contraction, an effect which would be exaggerated by the long parallel portion.

In R. & M. 1030 a better form of streamline body was used without the parallel portion and with various excrescences to give a conventional representation of the cylinders of the radial engine. The value of A was now approximately 1; the value of B was 13 for the body with no excrescences, but fell off to about half that value when the excrescences were present. These results do not seem entirely to bear out the explanation given of the high values of B observed in R. & M. 830. They are, moreover, very large compared with figures which one would expect from the analysis of full scale data and they are large compared with early slipstream experiments on the BE_2. They are also large in comparison with some experiments on the effect of the slipstream on a radial engine arranged for mounting on a twin-engined aeroplane which were carried out in Messrs. Boulton and Paul's Wind Channel These last-named figures would suggest values of A of 0·85 and values of B of 2·2, figures which have received fair confirmation from the analysis of the full scale results, but the bodies were not so large in relation to the airscrew as those of R. & M. 1030. R. & M. 1030 suggests the importance of the relationship between the relative position of the airscrew discs and the excrescences, any increase in this distance being reflected in the reduction of the coefficients. The important significance of the relative size of body and airscrew for the P.N.9 and P.N.7 in Fig. 25 are again emphasised by these results which would seem to suggest that over and above the advantages to be gained by having the lowest possible ratio of slipstream to free air speed, there is a further absolute advantage to be gained by having the body as small as possible in relation to the airscrew and keeping the airscrew itself as far forward as possible of any excrescences which must be there. Experience of aeroplanes with large rotary engines and comparatively small airscrews also tends to confirm this view, and the whole body of evidence undoubtedly shows great advantages should be derived by the use of propellers with the value of $k \times 10^{-3}$ not more than 30.

(To be continued.)

TECHNICAL LITERATURE.

SUMMARIES OF AERONAUTICAL RESEARCH COMMITTEE REPORTS.

DOPES AND DETONATION. SECOND REPORT.

By PROFESSOR H. L. CALLENDAR, C.B.E., LL.D., F.R.S.

Experiments made in the Air Ministry Laboratory at the Imperial College of Science, London, under the Directions of R. O. King, M.A.Sc. (McGill), A.F.R.Ae.S., by E. W. J. Mardles, D.Sc., F.I.C., and W. J. Stern, A.R.C.S., D.I.C., B.Sc., assisted by N. R. Fowler, A.R.C.S., D.I.C. Communicated by the Director of Scientific Research.

R. & M. No. 1062 (E. 23). December, 1926. (31 pages and 7 diagrams.) Price 1*s.* 3*d.* net.

The Effect of Peroxides in Nuclear Drops.—This report forms a continuation of the previous report on the same subject submitted to the Director of Scientific Research, November, 1925, which has been published by the Aeronautical Research Committee in their Reports and Memordanda No. 1013. In that report a nuclear theory of detonation was developed, founded on the thermodynamical and physical properties of paraffin fuels under the conditions prevailing in the cylinder of a high-compression engine. It was shown that residual drops, consisting chiefly of the higher paraffins, would tend to persist in the charge during compression, and in the portion of the charge remaining unburnt at any moment after ignition. These nuclear drops on account of their low ignition temperature, would act as foci of simultaneous inflammation, giving rise to detonation, though they form a very small percentage of the whole mixture.

The effectiveness of the metallic dopes, lead ethide and iron or nickel carbonyl, was explained by the fact that they naturally become concentrated in the nuclear drops, where they decompose, depositing metal, which tends to delay the oxidation of the drops. The low ignition temperature of liquid drops of the higher paraffins was accepted as an experimental fact, but it was anticipated that further light might be obtained when the chemical side of the problem had been adequately explored.

The investigation has included an experimental and theoretical study of low-temperature oxidation of liquid fuels in air, in conjunction with engine experiments to determine the relationship between detonation and observed chemical action.

The conclusion drawn from the experiments is that detonation in paraffin fuels and ether is due to the accumulation of peroxides in the nuclear drops during rapid compression. These drops ignite simultaneously when the detonation temperature of the peroxide is reached. The amount of peroxide formed would not in itself be sufficient to cause the detonation observed, but acts as a primer by simultaneous ignition of the nuclear drops. The metallic dopes act by reducing the peroxides as fast as they are formed, and preventing their accumulation, thus delaying the ignition of the drops.

There can be little doubt that the formation of peroxides, like that of nuclear drops, is greatly favoured by increased density of charge, as in a boosted engine. The H.U.C.R. of any fuel is thereby lowered, and the addition of dope is required to make the efficiency of a boosted engine equal to that of an unboosted engine, using the same fuel. If metallic dopes are employed it would appear that the boosted engine may require an excessive quantity, which might lead to serious trouble.

It is hoped that new methods of preventing peroxide formation, and consequent detonation, may be discovered, when the properties of the peroxides have been more fully investigated.

ON A MODIFICATION OF THE CHATTOCK GAUGE DESIGNED TO ELIMINATE THE CHANGE OF THE ZERO WITH TEMPERATURE.

By W. J. DUNCAN, B.Sc., A.M.I.Mech.E.

R. & M. No. 1069 (Ae. 251) (5 pages and 1 diagram.) December, 1926. Price 6*d*. net.

For the measurement of air speeds in pipes or wind tunnels a gauge known as the Chattock gauge is frequently used. In essentials this gauge consists of two cups containing liquid whose difference of level gives the suction pressure due to a given velocity. For ease of reading, an oil or similar surface of separation is used between the liquids in the two cups.

The ordinary form of Chattock gauge develops a creep of the zero when the temperature varies, and this creep is due to thermal expansion of the liquids employed. The present type of gauge has an additional bulb which makes the gauge largely self-compensating.

FULL-SCALE TESTS OF A SUSPENDED AIR LOG.

By J. K. HARDY, B.A. Presented by the Director of Scientific Research.

R. & M. No. 1074 (Ae. 256). (2 pages and 3 diagrams.) December, 1926. Price 4*d*. net.

The air log was designed to meet the need of an instrument which would record accurately the mean air speed under conditions such as are met with when the speed of an aeroplane approaches stalling speed. Under these conditions the limitations of control make it difficult for a reliable mean reading to be obtained from an air speed indicator or alcohol gauge. The air log records distance, and the true speed obtained corresponds to that obtained by continuously integrating the readings of an airspeed indicator corrected to standard density.

A further advantage is secured in that the perishable rubber tube of the suspended static head is eliminated.

The air log has been used for glides on a Bristol Fighter aeroplane, fitted with R.A.F. 30 section wings. Air speeds in the neighbourhood of the stalling speed have been recorded.

The instrument has behaved satisfactorily, and the results obtained by its use are in good agreement with those given by the standard method. In many cases it provides a better means of measuring speed than the suspended static head.

FULL-SCALE PRESSURE PLOTTING EXPERIMENTS ON HULL AND FINS OF H.M.A. R.33.

By LIEUT.-COL. RICHMOND, O.B.E., of the Royal Airship Works, Cardington.

R. & M. No. 1044 (Ae. 231) (26 pages and 30 diagrams). April, 1926. Price 1*s*. 9*d*. net.

These experiments were undertaken at the suggestion of the Aeronautical Research Committee on the revival of airship construction in this country in 1924. The importance of a careful estimate of the aerodynamic forces which come into play on large, high-speed airships was emphasised by the R.38 disaster. Although it was possible to institute more searching investigations than had been carried out in the past into the pressure distribution on models, it was considered that there was insufficient experience with regard to the degree of accuracy with which such model results could be applied to the full-sized airship.

The purpose of the investigation was to obtain an accurate estimate of the pressure distribution along one of the generators of the hull and also over the surface of the fins for the purpose of comparison with model results. It was hoped by such a comparison to obtain a more accurate estimate of scale effect than exists at present with regard to pressure distribution on airships. No model data on pressure distribution of an airship in circling motion exist at present. Results of pressure plotting experiments on a model of R.33 are given in R. & M. 801. Theoretical methods for obtaining the pressure distribution on a spheroid and applying this to the determination of the pressure distribution over the whole of the ship have also been worked out. The method for rectilinear flight is included in R. & M. 600; the method for curvilinear flight is included in R. & M. 780. It was hoped from the tests with R.33 in circling flight to investigate the degree of accuracy to be expected from the application of such theoretical methods.

Observations were taken in straight flight at three different speeds and in circling flight with 5°, 10° and 15° rudder. In another series of experiments observations were made in pitched flight with excess buoyancy covering a range of pitch from 4° to 12°. The results obtained are of great value for airship construction, especially in relation to two 5-million cub. ft. airships now under construction. Owing to the method of experiment there was a shift of the zero from which the pressure measurements were estimated, but it is expected that this shift was spurious. Making allowance for this effect, the curves obtained for the pressure distribution along the hull are in good agreement with existing model experiments. In the experiments on the fins the same shift of zero was observed, but the results cut out when comparing the pressures on opposite sides of the fin. The results in all cases agree well amongst themselves.

Curves of pressure distribution on hull and fins of the model are required for the case of circling flight (*i.e.*, on the whirling arm).

Further full-scale pressure plotting experiments are required on a shape having a more truly ellipsoidal form (as, for example R.101) for the purpose of comparison with purely theoretical methods, which are based on the pressure distribution over an ellipsoid. In these tests a method should be devised which will eliminate the shift in the zero which has occurred with the present experiments.

FULL-SCALE MEASUREMENT OF LIFT AND DRAG OF A BRISTOL FIGHTER WITH SLOTTED UPPER WINGS AND STANDARD LOWER WINGS.

By J. K. HARDY, B.A. Presented by the Director of Scientific Research.

R. & M. No. 1073 (Ae. 255) (3 pages and 3 diagrams). December, 1926. Price 4*d*. net.

The present report is an extension of experiments on slotted wings previously published (R. & M. 1007).*

Standard F.2B section lower wings were substituted for the Handley Page slotted wings on the Bristol Fighter aeroplane, which was used for the previous experiments. The large leading aerofoil only was used on the upper plane, and this was not altered. Measurements of lift and drag have been made over a range of incidence from 10° to above stalling.

The maximum lift coefficient is 0·74, as compared with 0·54 for a Bristol Fighter with the standard F.2B wing section, and 0·86 with both wings slotted.

The lift and drag of a model of the machine have yet to be determined.

* R. & M. 1007. Full-scale and model measurements of lift and drag of Bristol Fighter with Handley Page slotted wings.—By E. T. Jones, B.Sc., and L. E. Caygill, B.Sc.

HEAT-RESISTING AND NON-CORRODIBLE STEEL.

A most interesting paper on above subject was read on May 23 by Mr. S. A. Main, B.Sc., F.Inst.P., before the Institution of Aeronautical Engineers. Mr. Main, it might be pointed out, is associated with Sir Robert Hadfield at the Hadfield Research Laboratory of Sheffield. The paper commenced with the following passage, which is worth noting and taking to heart: "In few branches of engineering is enterprise more necessary, and indeed more evident, than in aeronautical engineering. Since all engineering progress is based upon the properties of the available materials, it is of first importance that the engineer should have up-to-date knowledge of the latest developments in this direction, and of the properties—and also the limitations—of the materials provided for his use. Without a knowledge of the latest progress of the metallurgist the engineer may perhaps be entirely ignorant that schemes, which are beyond the capacity of existing materials as he knows them, and therefore remain in abeyance, may be brought to fruition." Space does not permit of giving a summary of the paper, but it may be of interest to mention that the following alloy steels were referred to: "Era" steels of various classes in the heat-resisting steels, and "Era" Cr. (chromium steel) and "Hecla/ATV" among the non-corrodible steels. The lecturer, while admitting the somewhat higher cost of these special steels, pointed out that there are many purposes which they are able to serve in which their higher cost is amply justified. The paper was one of very great interest to all aeronautical engineers, and should be read in full in the Institution's JOURNAL.

ABHANDLUNGEN AUS DEM AERODYNAMISCHEN INSTITUT AN DER TECHNISCHEN HOCHSCHULE AACHEN

It is a somewhat peculiar fact that although in Germany the aerodynamic design of aircraft has been studied very fully indeed, the structural side has not received anything like as much attention. German aerotechnical literature is full of articles on aerodynamic subjects, but to come across one dealing with the subject of aircraft structures and the stresses set up in them is the exception rather than the rule. We admit that of the two the aerodynamic side is the more interesting, and that German aircraft designers are probably as well posted on structural design as any others, but the subject has not, on the whole, received much general publicity in the German aviation press. During the last few years there has been a tendency towards giving greater attention to this side of aircraft design, and it is perhaps significant that Number 7 of the *Abhandlungen aus dem Aerodynamischen Institut* of Aachen, published by Julius Springer of Berlin, is devoted almost entirely to the subject of stresses in beams.

Professor Th. von Karman contributes an article entitled "Uber die Grundlagen der Balkentheorie" (On the foundation of beam theory), in which he attacks the problem of deriving systematically the foundations of beam theory from the laws of elasticity, confining himself to the transition from two-dimensional strips to beams, the two-dimensional strip corresponding to a beam of rectangular section and small width.

Friedrich Seewald contributes an article on "Die Spannungen und Formänderungen von Balken mit rechteckigem Querschnitt" (Stresses and changes in form of beams of rectangular section), in which the author arrives at the conclusion that the problem resolves itself into two parts, one which is identical with the elementary theory, and the other which can be calculated once and for all for any given load. An examination of the inaccuracies involved leads to the belief that the solution given is sufficiently accurate for all practical purposes. The only exception is the case, which rarely occurs, when the length of beam is small in proportion to the depth.

"Stegbeanspruchung hoher Biegungsträger" is the title of an article by Ilse Kober, dealing with the stresses in the vertical walls of deep beams of box section, such as those frequently used in the wing spars of cantilever monoplanes. The authoress points out that the usual formulæ are sufficiently dependable for beams of normal proportions, but if the depth of the beam or spar is increased considerably, while the walls are reduced in thickness so as to save weight, a point is soon reached where the normal formulæ become unsatisfactory owing to buckling of the walls. The subject is dealt with at considerable length, and examples of how to use the new formulæ are given at the end of the article.

The last article in the present volume is by Max Knein, and deals with the stress distribution by in compression and plain change of form when lateral expansion is entirely prevented. Unfamiliarity with the German language is a stumbling block, but those fortunate enough to be able to read technical German will find in this book much of considerable technical value. The price is 7·50 gold marks.

Previous numbers of the *Abhandlungen* also contained interesting articles. Thus No. 6 (Price 7·50 mark) includes an article on the calculation of pressure distribution over airship hulls, by Prof. von Karman; and another, by Dr. Ing. Hans. Ermisch, on the air flow and pressure distribution over various bodies at various Reynolds Numbers. This is illustrated by diagrams, drawings, graphs and photographs showing actual flow patterns.

No. 5 of the Aachen *Abhandlungen* is devoted entirely to the subject of the theory of gliding and soaring flight, being a paper by Dr.-Ing. Klemperer. The price of No. 5 is 6 mark 90. All three numbers can be obtained from the publishers, Julius Springer, Linkstr. 23–24, Berlin W9.

SUMMARIES OF TECHNICAL REPORTS OF THE RIJKS-STUDIEDIENST VOOR DE LUCHTVAART, AMSTERDAM.

REPORT A. 98. AIR RESISTANCE OF TWO AEROPLANE RADIATORS.

The resistance to motion of two radiators which have been compared earlier* for cooling power has been determined, together with the influence of a yaw relative to the direction of the air stream.

The radiators differed only by the construction of the cooling surface. No. 1 was built along normal lines (round tubes with hexagonal equilateral openings), whereas No. 2 was of the André system (flat tubes with longitudinal grooves and flat hexagonal openings) (see also Figs. 2 and 3, Report A. 92).

Tables I and II give the resistances of both radiators normally exposed to the air stream. Table III and Fig. 2 show the influence of a yaw on the resistance of No. 1 radiator. The coefficients have been calculated with the formula given in the Report; they apply only to the resistance of the cooling core.

* Report A. 92. Verslagen en Verhandelingen R. L. Deel III, p. 11

REPORT A. 130. DISCUSSION OF THE RESULTS OF THE TESTS ON THE BOUNDARY LAYER OF THE AEROFOIL WITH ROTATING CYLINDER.

The results of the velocity measurements in the boundary layer described in Report A. 129 are discussed in detail. Consideration is given separately to:—

(*a*) The flow around an ordinary aerofoil (aerofoil with cylinder at rest and filled-up slot: *C*, Figs. 5, 6 (1)). The area with a steep velocity gradient is restricted to the immediate proximity of the surface. Even at the small angle of incidence used in the tests there is probably a dissolution of the flow on the after part of the upper surface.

(*b*) The influence of the rotating cylinder (aerofoil with rotating cylinder: *A*, Figs. 3, 6 for upper surface, Fig. 8 for lower surface). The velocity in the boundary layer on the upper surface is increased, this increase is perceptible over the whole upper surface; the dissolution at the after part is reduced. At a short distance of the lower surface of the cylinder there is probably a counter-current.

(*c*) The influence of the slot (aerofoil with stopped cylinder: *B*, Figs. 4, 7). In the foremost measuring points the slot caused an important retardation in the lower part of the boundary layer, followed by a more vigorous dissolution on the after part.

A programme for the continuation of the research is developed. Division into separate parts appears to be necessary. In the first place experiments will be made on the flow around an ordinary aerofoil by measuring the pressure distribution on the surface and the velocity distribution in the boundary layer.

REPORT M. 219. MECHANICAL PROPERTIES OF SOME MATERIALS THAT ARE USED FOR THE CONSTRUCTION OF AEROPLANES.

Generally speaking, the stresses that are tolerated in aeronautical constructions are greater than in other technical constructions.

Therefore it is necessary to keep a better account of the greatest stresses that may occur, and of the actual properties of the materials that are used. The Aeronautical Research Laboratories took the limit of permanent elongation (elastic limit) for base of the strength calculations. In order to investigate the actual properties of the materials used, many tests were taken on different steels, woods, light aluminium alloys, and on covering fabrics.

The results of these tests are shown in the tables, where also many data from other publications are given. It is possible to make a comparison between the properties of the different materials by use of the ratio $\frac{T}{S.G.}$ (tensile strength: specific gravity) or $\frac{D}{S.G.}$ (compression strength: specific gravity).

Further particulars about the methods of testing and the results obtained will be given in following publications.

FLIGHT
AUTHORITATIVE ENGINEERING AIRSHIPS

NEW YORK–PARIS

Lindbergh's Non-Stop Flight Across the Atlantic

CAPT. CHARLES LINDBERGH, a hitherto little-known (on this side of the Atlantic) American pilot set out from New York, piloting a Ryan monoplane fitted with a 220 h.p. Wright "Whirlwind" engine, on May 20 at 8 a.m. (12.50 p.m. B.S.T.) with the object of flying non-stop to Paris, a distance of a little over 3,600 miles. On May 21, at 10.22 p.m. (B.S.T.) he landed at Le Bourget, amidst scenes of enthusiasm and excitement unparalleled in the world of flying.

The fact that the 3,600 miles between New York and Paris has been covered by air in 33½ hours non-stop flight is, in itself, a remarkable and record-breaking event, but the circumstances under which this record has been achieved make it without doubt the "biggest noise" that has yet happened in the history of aviation. For Lindbergh accomplished his journey single handed, in a machine (specially built for the flight in 60 days) with but the minimum of equipment—he had neither wireless nor the special navigating instruments usually employed on flights such as this—and without any elaborate preparations. In fact, when he started from New York there were not many who thought he would get through and the attempt was varyingly described as "sporting," "daring," and "fool-hardy."

Certainly, on the face of it, he had little chance of succeeding, for there was not only the question of his being able to withstand the strain of over 30 hours of piloting, navigating and engine noise, without relief from a second person, but flying as he was in a simple land 'plane, there was very little hope, in the event of anything going wrong and necessitating a forced descent in the Atlantic, of rescue—especially as he was not equipped with wireless. However, he *did* get through and, we think, refuted the nickname "Flying Fool" that had been applied to him, for although luck no doubt played a big part in his success, he none the less displayed considerable skill, courage and endurance in carrying out his task.

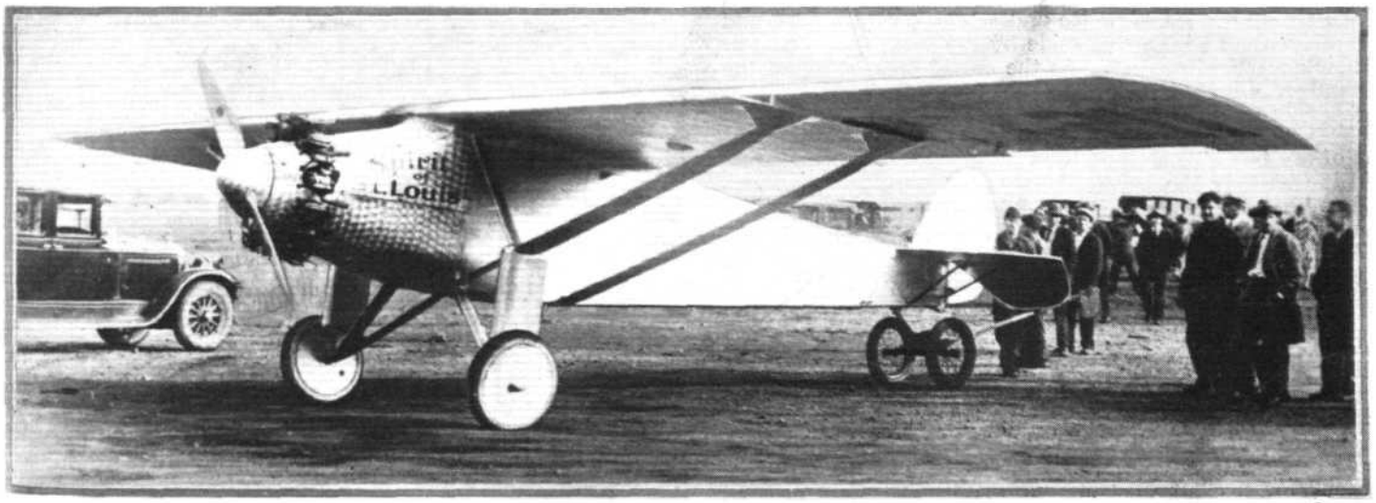
THE NEW YORK-PARIS FLIGHT: Capt. Charles Lindbergh, Legion of Honour, who piloted, single-handed, his Ryan monoplane 3,600 miles across the Atlantic, from New York to Paris. This photograph was transmitted by telephone wires from St Louis to New York.

Before he left New York on Friday morning, Lindbergh received very favourable weather reports, which, except for an early stage of the flight, proved correct. With his Ryan monoplane weighing some 4,750 lbs. all up, the take-off naturally presented some difficulty, but favoured with a long slope for his initial run, which had been specially prepared for Commander Byrd's flight, the machine got away without mishap.

His journey along the coast passed without incident, but on reaching Nova Scotia (that night) his first troubles commenced. Here he encountered rain and snow, and he endeavoured to avoid this, first, by coming down low to within a few feet of the water, and then ascending to several thousand feet, but without success. It was not until he had flown about 1,000 miles through this bad patch that he struck fine weather once more. Fortunately, the night section of the flight was a short one, owing to the northern latitude.

Lindbergh passed over St. Johns about midnight, and early next morning his machine was sighted by a C.P.R. liner about 500 miles from Newfoundland. The next news of his whereabouts came the following day from the steamer *Hilvesum*, which reported having seen him flying fast 500 miles from the Irish coast early in the afternoon.

During the Atlantic crossing Lindbergh did not sight any



THE NEW YORK-PARIS FLIGHT: The Ryan monoplane "Spirit of St. Louis," fitted with a 220 h.p. Wright "Whirlwind" engine, on which Capt. Charles Lindbergh flew from New York to Paris in 33½ hours.

ships in the day time, and only saw the lights of one at night. It should be noted, however, that there was fog and mist most of the time.

At 4.30 p.m. the "Spirit of St. Louis" was sighted 100 miles off Valentia, Ireland, and about half an hour later passed over Smerwick Harbour, County Kerry, flying at about 1,000 ft. A few minutes later it was observed over Baltimore, County Cork, and at 5.50 p.m. it left the Irish coast at Goleen and steered for Cornwall.

Lindbergh was seen at several points in the vicinity of Cornwall, at St. Germans at 7.40, and off Plymouth ten minutes later by a British submarine. He was next seen at Cherbourg, at 8.30 p.m., after which he made good progress to Le Bourget.

Meanwhile remarkable scenes were taking place in Paris. Throughout the afternoon large crowds collected outside the various newspaper offices, and opposite the electric news signs in the Place de l'Opera, in order to follow his progress. But late in the afternoon, when news came through that he had passed over Ireland the crowds spontaneously burst into enthusiastic cheering—in spite of the sad thoughts in the minds of most for their own heroes, Nungesser and Coli, who had so mysteriously vanished while engaged on a similar mission. "Vive Lindbergh!" was heard everywhere, and when the news came that he had been sighted from the light-house at Cherbourg—well, Paris went mad with delight. It was then that thousands made for Le Bourget—where already quite a large number of people were waiting.

Special preparations had been made at Le Bourget to receive Lindbergh, and a committee of welcome was formed, headed by Mr. Myron T. Herrick, the U.S. Ambassador, and including M. Fallières, Minister of Labour, representatives of the President, and the Minister of War, and many well-known French pilots. M. Raymond Orteig, who offered the prize of £5,000 for the first non-stop flight between New York and Paris—which, of course, Lindbergh wins—was unable to reach Le Bourget in time to greet the airman.

As darkness fell the Le Bourget aerial beacon sent out its flashes to guide the airman into Paris. Incidentally, it may be mentioned here, that Lindbergh first saw the Le Bourget lights when about 30 miles away. People were still arriving at the aerodrome, and by 10 p.m. the crowd increased to over 100,000 strong. Weather conditions were ideal, there being practically no wind and the sky was cloudless. From 9 p.m. rockets and storm shells were sent up at two-minute intervals, while occasionally searchlight beams swept the sky.

At 10 o'clock the aerodrome flood lights were turned on, lighting up the landing ground as if it were day time. All this time the crowd had been waiting patiently and calmly, but with growing excitement, and when, a few minutes after 10 o'clock, the faint drone of an engine was heard, this excitement increased almost to "bursting point." Thousands of eyes and the 'drome searchlights swept the sky for the machine, but without success, until suddenly the "Spirit of St. Louis," looking spirit-like indeed, loomed into view some 900 ft. up.

There was a tense moment when Lindbergh, after having made three circuits of the 'drome, came cautiously down and made a perfect landing at the western end of the ground. As the machine came to rest after a run of about 100 yards, there was a roar of cheering and a wild rush towards the stationary machine, during which several people were injured.

The strong cordon of police and soldiers, wire fences, and barricades were soon swept aside by the surging crowd, now completely out of control. As the crowd pressed round the monoplane, Lindbergh, so it is reported, poked his head out of the side window and said, "I am Lindbergh. Where am I?" On being told "Paris," he said, "Good. Help me out of my box!" He was literally pulled out of the cabin, and it was only the energetic efforts of some soldiers, who had to use their rifle-butts, and a few pilots, that saved him from injury at the hands of the mob.

At this moment, whether by design or not we cannot say, a mechanic was hoisted shoulder-high and carried in triumph towards the aerodrome headquarters, with the cheering crowd pushing all round. Meanwhile Lindbergh himself, still smiling, was smuggled away to the Air Union offices, where a thrilling informal greeting took place between this cheerful, modest young pilot and the American Ambassador, Government representatives, and several French pilots. He was, he declared, quite fresh and did not feel the need for sleep. He offered to go out and show himself to the crowd, clamouring without for a sight of him, but medical advisers ordered otherwise, and after a short rest he was once again smuggled away, disguised, in a car to the American Embassy. On his way there he stopped at the tomb of the Unknown Soldier, where, despite his fatigue, he paid a silent tribute to the French heroes—a little incident that has deeply impressed the French people.

Meanwhile, a large number of people remained on the aerodrome in the hope of seeing the airman, and some of them, in their efforts to secure souvenirs, tore pieces of fabric and metal off the machine before it could be placed in a hangar under a strong guard.

At the U.S. Embassy, Lindbergh first had a bath, and then a meal of soup, eggs and milk, during which he gave a lively account of his journey. Then, at 4 a.m., he retired to bed, and did not wake until 2.30 p.m. on Sunday. While he slept many distinguished visitors called at the Embassy with congratulations.

H.M. King George has sent a telegram of congratulation to Capt. Lindbergh, while M. Doumergue, President of the French Republic, sent the following telegram to President Coolidge :—

"On the morrow of the attempt of our aviators whose misfortune was so keenly felt by the generous hearts of your countrymen, Charles Lindbergh has achieved what Nungesser and Coli attempted, and, by a bold flight, has established an aerial link between the United States and France. All Frenchmen unreservedly admire his courage and rejoice in his success. I send you the hearty congratulations of the Government of the Republic and of the whole French people."

To which President Cooledge replied :—

"I thank you for your cordial message, which I share with the American people. I rejoice in the success of the young man who so courageously undertook his lonely flight, but neither myself nor the people of the United States forget to share in the mourning of France for the recent loss of your two brave aviators. Progress in aviation is due in large measure to French genius, which has contributed to our rapprochement and so increased our heritage of sympathy and good understanding."

President Coolidge also sent the following cablegram to Captain Lindbergh :—

"The American people rejoices with me at the brilliant termination of your heoric flight. The first non-stop flight of a lone aviator across the Atlantic crowns the record of American aviation, and in bringing the greetings of the American people to France you likewise carry the assurance of our admiration of those intrepid Frenchmen, Nungesser and Coli, whose bold spirit first ventured on your exploit, and likewise a message of our continued anxiety concerning their fate."

Congratulations on Captain Lindbergh's flight were sent by the Secretary of State for Air, Sir Samuel Hoare, to Captain Lindbergh himself, through the British Air Attaché in Paris, and to the United States Government, through the British Air Attaché in Washington.

King Gustav of Sweden has also sent a message of congratulation.

Sir Alan Cobham flew over to Le Bourget on Sunday to congratulate Captain Lindbergh personally.

On Monday Captain Lindbergh received the cross of the Legion of Honour from President Doumergue, at the Elysée.

It is stated that Captain Lindbergh will fly over to Croydon on Monday next.

The following brief particulars regarding the Ryan monoplane, "Spirit of St. Louis," may be of interest. This machine was specially constructed for the Atlantic flight by Ryan Airlines Inc., of San Diego, California, a firm that has been carrying on a successful aircraft constructing and operating business for some years, and have recently been associated with one of the U.S. Contract Air Mail routes, on which Ryan monoplanes are employed.

The "Spirit of St. Louis" is similar to the standard Ryan monoplanes, being of the high-wing type with totally enclosed fuselage, but with larger wings and extra fuel tanks. The fuselage is of steel construction, and the wings, which are of fairly thick section and braced from the fuselage by sloping struts, are of wood construction with box spars, fabric covered doped with "Titanine." The landing chassis has a very wide track and is of the non-axle type.

A 220 h.p. Wright "Whirlwind" engine—a 9-cyl. air-cooled radial—is installed, the magnetos being Scintillas, the sparking plugs "A.C.", and the carburettor a Stromberg.

The overall span of the wings is 46 ft., their chord 7 ft., and the area 312 sq. ft. The gross weight of the machine, with 425 gallons of petrol and 28 gallons of oil, is 4,750 lbs. Thus the wing loading comes out at 14·9 lbs. per sq. ft., and the power loading, 21·6 lbs. per b.h.p. The speed range, with full load, is 69-123 m.p.h. (with normal load, 44-129 m.p.h.).

As previously stated, the machine was equipped with but a minimum of instruments, viz., temperature gauge, oil

pressure gauge, tachometer, altimeter, turn and banking indicator, air speed and drift indicator, speed timer, clock, and earth indicator compass. It was by means of this latter instrument, and a careful study, before starting, of the map that Lindberg navigated himself so accurately over the 3,500 miles' journey! Of the rest of the machine's equipment, this consisted of a knife, a pair of pliers, a bag of provisions and a tin of water. One thing worried Lindbergh, at the conclusion of his flight—and that was that he still had sufficient petrol left for another 1,000 miles!

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THE FOURTH INTERNATIONAL AERO SHOW AT PRAGUE

June 4-16, 1927

This year it has been a matter of some difficulty to obtain advance information concerning the Fourth International Aero Show to be held at Prague from June 4 to June 16. As far as can be gathered, the exhibition will be of a truly international character, the following countries being represented: England, Belgium, France, Italy, Germany, Yugoslavia, Poland, Roumania and Sweden.

England does not promise to be quite as well represented as might have been desired, and apparently no concerted action has been taken by the S.B.A.C. At the moment there is, apparently, a possibility that the de Havilland Aircraft Company may send over a machine, but even this has not been definitely decided, and it looks as if the only British firm to be represented may be Vickers Ltd., who will show a comprehensive series of aviation equipment such as sundry petrol system accessories, Davis navigation lights, aircraft electric lighting generating equipment, specimens of tierods and Rafwire, oleo-pneumatic undercarriage units, a dummy steel aeroplane fuselage to carry gun mountings, etc., a Reid control indicator, an "Eagle" automatic electric air camera and mounting, Class "F" Vickers R.C. guns with drums, Vickers belt feed guns with C.C. gear and sights, Vickers Scarff wind-balanced aircraft gun mountings, No. 7 and 8, bomb racks (20, 112, 230 and 520 lbs.), and bombs weighing 20, 50, 112, 230, 520 and 550 lbs. each, Holt landing light brackets and flares, signals and pyrotechnic stores, a Hythe Mark III gun camera, and photographs of various Vickers aircraft.

France will be represented on quite a large scale. As usual she will exhibit an impressive propaganda department with photographs, transparencies, tableaux, etc., illustrating various phases of her air activities. Several French aircraft constructors will be showing. For instance, Farman Brothers will have on view a "Jabru" monoplane and a "Goliath" biplane. Other French constructors exhibiting are said to include Dewoitine and Breguet. The accuracy of this statement seems a little doubtful, since the Dewoitine works closed down some time ago. Other French exhibits will include aerial cartography, parachutes, and various components and accessories.

According to the latest information available, the German aircraft firms are not exhibiting individually, but several makes of aeroplanes will probably be on view since the German Lufthansa has taken space at the exhibition. Other German firms to be represented are the Kaltleim Industrie "Certus" of Hamburg, the Kartographische Reliefgesellschaft of Munich, and the Süddeutsche Kabelwerke.

Apparently by far the most imposing foreign section at the Prague Show will be the Italian, which promises to be really representative, and to bear testimony to the great strides made by Italian aviation during the last few years. Italian aircraft types represented will include the Fiat CR 20 with Fiat A-20 engine, a Savoia S. 59 seaplane with Isotta-Fraschini "Asso" engines of the type used by the Marquis of Pinedo, while there is some possibility that the Macchi 39 mono-seaplane with which de Bernardi won the Schneider Trophy Race will be shown. Models of the Caproni Ca-73, the Savoia S-55, the Macchi M-24 and a R-22 will also be exhibited. Italian aero engines will be represented by three Fiats, the types A-20, A-22, and A-25, as well as by Isotta-Fraschini "Assos."

Belgium, it is understood, will not actually exhibit any aeroplanes, but will show photographs, posters, tableaux, etc., illustrating the progress of civil aviation in Congo.

From Yugoslavia is expected a machine designed and built by S. Vlajkovic & Sons. This will be a little sports type with Anzani engine. It seems likely that Poland will send examples of aircraft types designed by Bartels and Zalewski, two well-known Polish aircraft designers, while Roumania has promised to send one of the seaplanes from the state aircraft factory, and also a new type "Proto Astra."

Sweden will be represented by the "Flygindustrie" of Malmö.

Czechoslovakia itself will be well represented, as was to be expected from a nation that has made such great strides since first taking up aircraft and aero engine construction a few years ago. The three well-known Czech aircraft factories "Aero," "Avia," and "Letov" will exhibit some of their older types, as well as several new ones. Milos Bondy a Spol will show, among other machines, an "Avia" B.H.33 single-seater fighter with "Jupiter" engine, an "Avia" B.H.26 two-seater fighter, also with "Jupiter" engine, an "Avia" B.H. 25-passenger carrier with 450 h.p. Lorraine, an "Avia" B.H.11 two-seater light monoplane with Walter engine an "Avia" B.H. 20 training biplane with Walter engine, an "Avia," B.H. 29 two-seater school machine for initial training, and an "Avia" B.H.22 single-seater transition machine with 180 h.p. Hispano. Particulars of the "Aero" and "Letov" exhibits are not available at the moment.

Among Czechoslovak aero engine firms a brave display will be made by the Walter and Skoda firms, although we are informed that Breitfeld Danek I Spol will not be showing.

The Walter firm, in addition to their own well-known radial engines of various powers from 60 h.p. upwards, will exhibit 185 and 240 h.p. B.M.W. engines and Walter-Jupiters of 425 h.p. Thus the Bristol "Jupiter" will be represented at least by the Czechoslovak licensees, and very probably also by the Gnome-Rhone company.

The famous Skoda Works will also be represented, although particulars are not available. In all probability the main works will exhibit Hispano-Suiza engines built under licence, while Laurin & Klement, now incorporated in the Skoda works, may exhibit Lorraine engines, of the building of which they have made a speciality. Incidentally, it should be recollected that the Skoda works took over the "Avia" firm some time ago, although we gather that the "Avia" machines will be shown as such, and not as Skoda machines. In addition to their other activities, the Skoda Works have established a branch in Poland, known as the Polish Skoda Works. They have also formed an independent company for operating commercial air lines to adjoining states.

Altogether the Prague Aero Show promises to be one of considerable interest, and it is to be regretted that Great Britain is not to be more extensively represented.

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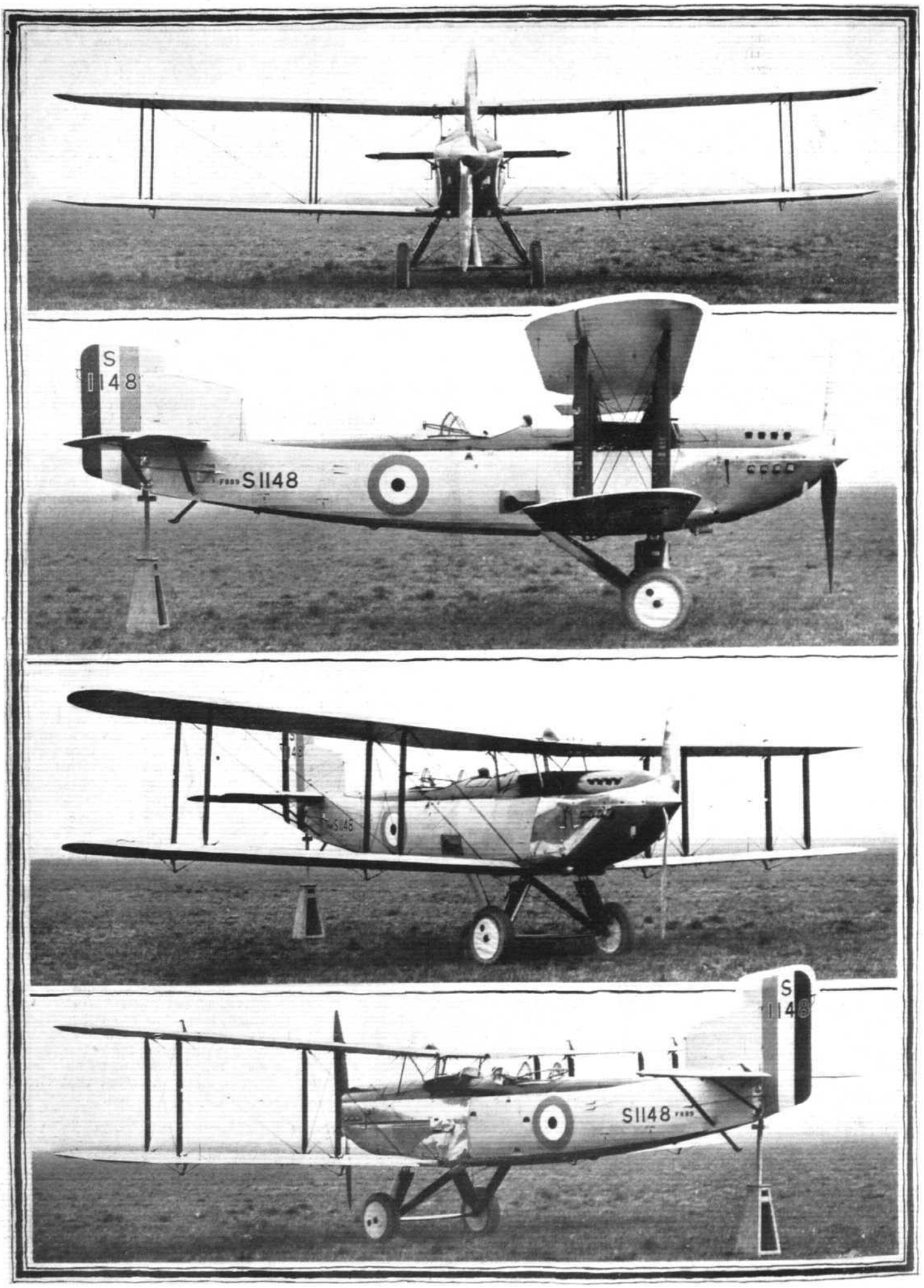
The Aviation Ball

THE Aviation Ball to be held at the May Fair Hotel on June 30, referred to in our last issue, is not organised by the Institution of Aeronautical Engineers as stated, for it has no connection with the National Fund for the Promotion of Aeronautics for whom the proceeds of the ball will go. Amongst those who have already given their patronage are: Lieut.-Col. the Rt. Hon. Sir Samuel J. G. Hoare, Secretary of State for Air; Brig.-General Lord Thomson; Mr. F. G. L. Bertram, Deputy Director of Civil Aviation; the Earl and Countess of Craven; Lord and Lady Strathspay; the Countess of Clancarty; the Countess of Westmorland; Rosalie, Countess of Cork and Orrery the Hon. Lady Chichester; the Hon. Mrs. John Russell; Sir Robert Hadfield; Lieut.-Col. J. T. C. Moore-Brabazon; Capt. G. Garro-Jones; Capt. Peter Macdonald; Earl Fitzwilliam and the Hon. Lady Bailey.

The Royal Air Force Memorial Fund

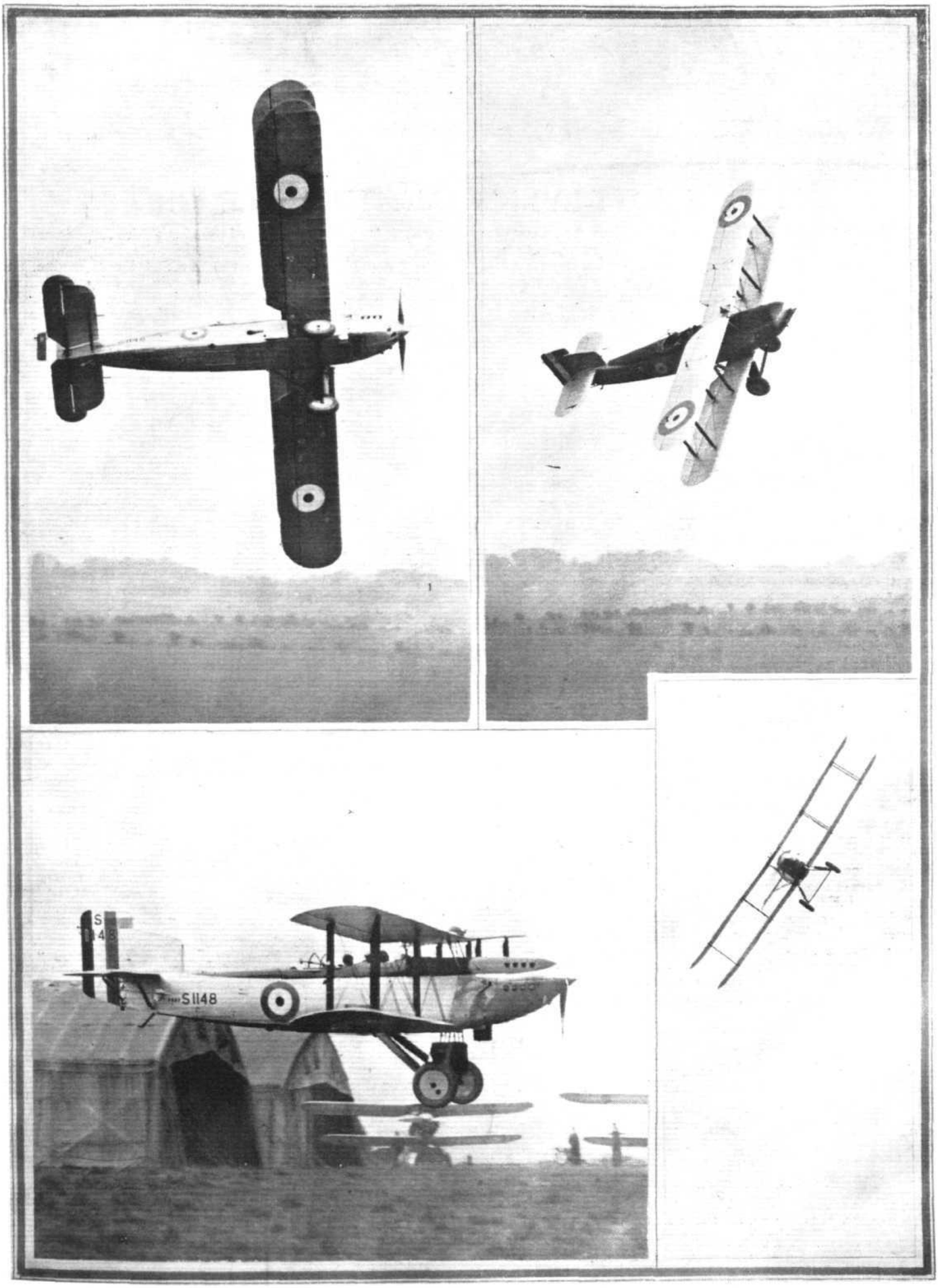
THE usual meeting of the Grants Sub-Committee of the fund was held at Iddesleigh House, on May 19. Mr. Walter S. Field was in the chair, and the other members of the committee present were Mrs. L. M. K. Pratt-Barlow, O.B.E., Sqdn.-Leader Douglas Iron, O.B.E. The committee considered in all 15 cases, and made grants to the amount of £78 10*s.* 8*d.*

The next meeting was fixed for June 2, at 2.30 p.m.



["FLIGHT" *Photographs*

THE FAIREY IIIF MACHINE WITH NAPIER "LION" ENGINE: The R.A.F. Flight from Cairo to the Cape and back, which has just been successfully concluded, was carried out on machines of this type. The IIIF has quite a resemblance to the Fairey "Fox."



["FLIGHT" *Photographs*

SPEED AND MANŒUVRABILITY: These views of the Fairey IIIF in flight, piloted by Capt. Norman Macmillan, give some idea of the way this machine can be "thrown about." The Cairo-Cape-Cairo flight was carried out by four machines of this type.

PRIVATE FLYING

A Section of FLIGHT in the Interests of the Private Owner, Owner-Pilot, and Club Member

MRS. ELIOTT-LYNN'S ALTITUDE RECORD

IT is the exception rather than the rule to find amateurs making records in events or spheres where usually only professionals predominate. It is accentuated where the amateurs are women and the sphere aviation. It is still a common prejudice for women, as aviators, to be rather disdained. Mrs. Eliott-Lynn has perhaps done more for her sex in the squashing of this prejudice than any other woman. She has been pre-eminent amongst her sex as a pilot since the light 'plane movement began its work of making civilian air pilots. She graduated through the London Aeroplane School in its first year of existence and has never ceased to fly since. Her affections have changed from the "Moth" to an S.E.5A, but her affections for the art have not. Now she has recently established a world's record in a class that had not previously been attempted and in doing so she has, as fairly claimed, accomplished something that is likely to be of real use to aviation. She has not only demonstrated the efficiency of a light aeroplane but she has proved conclusively the adaptability of her sex to conditions of the air beyond the normal. It is perhaps in this latter respect that the greater value of her feat in the interests of aviation lies. Incidentally the choice of her accomplishment was most appropriate, for at long last we enter the lists, however lowly, of the world's records. It was fitting that associated with her in the record making was another distinguished woman-pilot, the Hon. Lady Bailey, a pupil from the same school. It was in Lady Bailey's "Moth" that they flew down to Hamble from Stag Lane on Wednesday, May 18, there to be received by Mr. R. J. Parrott, chairman of the Hampshire Aeroplane Club. For the attempt the machine singled for the distinction was an Avro "Avian" fitted with the Mark II Cirrus engine, and after final adjustments had been made to this Mrs. Eliott-Lynn took off, with her companion in the front seat, before most of the employees of the Avro Company and the two official observers, Major R. Ross White and Captain G. I. Thomson, the secretary and chief instructor pilot respectively of the Hampshire Club. Ascending quickly the "Avian" circled the aerodrome and then disappeared on its climb that had as yet remained unrecorded. It was quite 2½ hours later before it suddenly emerged again and made a safe landing. When Lady Bailey returned the sealed altigraph to the waiting officials and it was revealed that 16,000 feet had been reached congratulations were naturally showered upon them. England had won a record! Mrs. Eliott-Lynn said afterwards that she had found the air severely cold at that altitude, but it had not affected her breathing to any appreciable extent. The class for which the entry had been made only came into existence on May 1 this year. It was for two-seater light 'planes, and a passenger had to be carried, whilst empty the machine had not to weigh more than 880 lbs. It is Mrs. Eliott-Lynn's distinction to hold a "B" licence as well as an "A" licence, and she is thus qualified to carry passengers for money and act as a commercial pilot. It is her ambition to beat the woman's altitude record of 22,000 feet held by an American.

["FLIGHT" *Photograph*

FIRST BRITISH LIGHT 'PLANE WORLD'S RECORD: This was established last week by Mrs. Eliott-Lynn in an Avro "Avian" with A.D.C. "Cirrus Mark II" engine.

LIGHT 'PLANE CLUBS

London Aeroplane Club

THE total flying time for the week ending May 22, 1927, was 44 hrs. 30 mins.

Pilot Instructors.—Capt. F. G. M. Sparks, Capt. S. L. F. St. Barbe.

Dual Instruction.—A. J. Richardson, C. H. Swan, J. R. de Havilland, J. G. Crammond, L. Daniels, A. C. M. Jackaman, R. Drysdale Smith, J. J. Hofer, L. W. Gibbens, Miss Spooner, Lord Carlow, A. J. Mulder, E. D. Moss, J. A. Simson, G. M. Randall, I. H. McClure, R. Morris, A. Southgate, E. R. Winter.

Solo Flying.—J. Martin, R. S. Clark, Miss O'Brien, O. J. Tapper, E. T. Symmons, A. J. Richardson, A. C. Pearson, R. Malcolm, E. D. Moss, G. H. Craig, A. J. Mulder, E. L. D. Moore, Sqdn. Leader M. E. A. Wright, D. P. H. Esler, H. Petre, A. F. Wallace, L. J. C. Mitchell, G. Terrell, A. R. Ogston, Major K. M. Beaumont, D.S.O.

Passenger Flights.—J. R. S. Charles.

Aviator's Certificate.—On Wednesday, May 18, 1927, E. L. D. Moore passed the tests for his Aviator's Certificate.

The Hampshire Aeroplane Club

REPORT for nine-day period ending May 22:—

Four days of the above period were non-flying days, gales prevailing on three and the fourth was rendered blank by reason of a pupil putting his foot through a rib of the bottom plane.

Some idea of the strength of the wind during the gale period may be gathered from the fact that a Ford delivery van was blown over on a road close to the aerodrome.

The flying times were:—Instruction flying, 6 hrs. 15 mins.; solo flying, 2 hrs. 20 mins.; joy rides, racing, etc., 4 hrs. 20 mins.; test flights, 1 hr. 5 mins. Total, 14 hrs.

The following members had instruction:—M. R. Berney, 55 mins.; Major C. E. Kenkins, 50 mins.; W. D. Cox, 40 mins.; F. G. Moloney, 35 mins.; N. J. Bishop, 35 mins.; R. H. Chaffey, 30 mins.; W. P. Courtney, 30 mins.; —. Whittle, 25 mins.; T. F. Brewster, 20 mins.; D. A. R. Cripps, 20 mins.; B. B. Henderson, 15 mins.; R. H. Bound, 10 mins.; and W. Clymo-Southcliffe, 10 mins.

The soloists were Flying Officer R. F. Overbury, 30 mins.; E. I. C. Wyllie, 30 mins.; K. P. L. Bowen, 25 mins.; A. M. Keeping, 15 mins.; M. B. Shepherd, 10 mins.; Flight-Lieut. Crawford, 10 mins.; Lieut. A. M. Kimmins, R.N., 10 mins.; and Flying Officer C. Clarkson, 10 mins.

The joy riders were Miss Jenkins, Miss Swift, Mr. Bucklen, Lieut. Graham, R.N., A. R. Vanden Bergh, R. L. Carter, R. H. Bound, Mr. Fortlage, Mr. Puttock and Miss Renfrew.

McCracken, our ground engineer, has had to cope with an additional responsibility during the last few weeks, for a skylark became so impressed with Captain Thomson's efficient and thorough method of instructing pupils to fly, that she decided that her offspring should benefit by his guidance, and she built a nest and fitted it up complete with four eggs under a tuft of grass on the busiest part of our 'tarmac'.

Great caution on the part of our pupils and instructor prevented the small factory being demolished by taxying Moths and Avians, but the advent of the Pageant brought added danger, so the nest was protected by bricks

FLIGHT
AIRCRAFT ENGINEER AIRSHIPS

laid on three sides, and this precaution undoubtedly saved the four small monoplanes which duly appeared on May 15, for one large aircraft actually taxied right over the bricks without doing any damage to the additions to our stock.

They were duly passed A.I.D., and are now on the point of going solo.

We appreciate the helpful suggestions for organisation which have been published in reports of our Pageant, and, being wise after the event, we realise their wisdom. However, we have gained a great deal of experience, which will be invaluable to us when organising our next event, but whatever we accomplish, we shall never be satisfied, so that's that.

We enrolled our hundredth pilot member this week, so it may become necessary to inaugurate a waiting list shortly.

Lancashire Aero Club

REPORT for week ending May 21.—Splendid dart-throwing and shove-halfpenny weather has prevailed during the week. Total flying time, 27 hrs. 40 mins., made up as follows :—Dual with Mr. Brown—Messrs. Shiers and Harber, 1 hr. each ; Torres and Rowley, 55 mins. each ; Davidson, 50 mins. ; Ward and Turner, 40 mins. each ; Keay and Hardy, 30 mins. each ; Musgrave, Caldecott, Leeming, Pattricoux, Miss Emery and Miss Baerlein, 25 mins. each ; Meades, 20 mins. ; Ruddy and Stonex, 15 mins. each ; Goodyear and Gattrell, 10 mins. each ; Dickinson, 5 mins.

Dual with Mr. Cantrill :—Messrs. Chapman, 25 mins. ; Miss Baerlein and Ruddy, 15 mins.

Solo :—Messrs. Costa, 2 hrs. 30 mins. ; Abdalla, 2 hrs. 5 mins. ; Twemlow, 2 hrs. ; Chapman, 1 hr. 20 mins. ; Nelson, 40 mins. ; Lacayo, 30 mins. ; Forshaw, 25 mins. ; Leeming and Goodfellow, 15 mins. each ; Ward, 10 mins. ; Musgrave, 5 mins.

Joy-rides :—With Mr. Brown—Mr. Murrell (Photography), 65 mins. ; with Mr. Leeming—Mr. Heys, 45 mins. ; Walton, 15 mins. ; with Mr. Costa—Mr. Hibbs, 30 mins., Miss Shaw, 15 mins. ; with Mr. Cantrill—Miss Wrigley, 10 mins. ; Messrs. Smith and Schofield, 10 mins. each ; with Mr. Scholes—Messrs. Lockwood and Robinson, 10 mins. each ; with Mr. Lacayo—Mr. Hartley, 20 mins. ; with Mr. Twemlow—Mr. Meades, 15 mins.

First solos were made during the week by Messrs. Ward and Musgrave, while Mr. Chapman successfully accomplished his height test.

On Saturday, the 14th, Messrs. Goodfellow and Dobson flew to Hamble on the Avro Avian G-EBRC, returning on Monday in the Lynx Tourer, KQ. The trip took 2½ hrs. each way, as compared with 8 or 9 hrs. by car or train. Unfortunately they were not allowed to compete in the inter-club utility race, as G-EBRC was not registered in the name of the club. The machine finished well up in the three big races, but Mr. Goodfellow's solitary success was in the " bicycle race " (Pageant of Travel Relay) in which, pedalling at a steady 2,000 r.p.m., he came home an easy winner !

Work on the club-house extensions is proceeding at an amazing pace, and the new balcony is already up to the roof. The " amenities " are proceeding more slowly, but their outlines may be observed by those who look closely into matters !

One would like to offer congratulations this week to :—(1) The Hampshire Club on having set up a standard for other clubs to try and surpass in the matter of displays. (2) The London Club on the consistently fine flying of their Bristol Brownie, JM, at the H.A.P. (will no one give US a Brownie ?). (3) The Yorkshire Club on having averaged nearly 27 hrs. flying a week for the first five weeks since Mr. Beck took charge. (4) The Bristol and Wessex Club on their contributions to the "Club Notes." (5) Messrs. A. V. Roe & Co., Ltd., on capturing the first light aeroplane world record.

Midland Aero Club, Ltd.

REPORT for week ending May 21 :—The total flying time was 18 hrs. 9 mins.

The following members were given dual instruction by Mr. McDonough :—J. Austin, R. Cazalet, R. D. Bednell, C. Burrows, S. H. Smith, E. P. Lane, J. C. Rowland, R. L. Brinton.

Solo :—W. Swann, E. J. Brighton, E. R. King, R. L. Jackson.

Passenger flight :—J. E. Brewin. Passenger with Mr. Brinton : R. L. Brinton.

On Monday Mr. McDonough, accompanied by Mr. Halland, flew from Hamble to Castle Bromwich, the flying time being 1 hr. 35 mins.

Air Vice-Marshal Sir W. Sefton Brancker arrived at the Aerodrome on Friday in a D.H. Moth, piloted by Mr. Hubert Broad, and left on Saturday, after having carried out an inspection of the Club.

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Light 'Plane Flight to Australia

ON May 24, Mr. Dennis Rooke, left Croydon in a " Moth " for Australia, following the route taken by Sir Alan Cobham. He proposes to split the long flight in short stages of 300 miles each. His machine, which he only ordered four weeks ago, has a range of 8 hours. Mr. Rooke recently had a refresher course at the De Havilland School and his venture is purely a private affair. He was formerly an R.A.F. Officer. He is taking no other clothes than those he is wearing, whilst his chief items of luggage are a suitcase and a collapsible boat.

Newcastle-upon-Tyne Aero Club, Ltd.

FLYING report for week ending May 15 : Total, 28 hrs. 10 mins. ; 14 hrs. 40 mins. on LX, and 13 hrs. 30 min. on Q.V.

Dual : 17·05, " A " Pilots—8·40 ; joy rides with Mr. Parkinson, 2·25. In addition, 3 hrs. 30 mins. was flown on the D.H. 53.

The following members flew under instruction : : Mrs. Heslop, Messrs. Heaton, Wood, Pargeter, Shaw, Rasmussen, Miesegaes, Mardill.

" A " Pilots : Mr. R. N. Thompson with Mr. A. Bell, Mr. C. Thompson, Mr. H. Ellis, and Mr. A. Bell.

Joy rides : Mrs. Heaton. Mr. Parkinson also flew with members of the " Blue Saraphan " Company, who were visiting Newcastle.

QV was flown to Hamble by Mr. Parkinson with Miss Leathart as passenger. Mr. H. Ellis was the passenger on the return trip.

The 53 was flown by Messrs. Heppell, R. N. Thompson, H. Ellis, W. Baxter Ellis, and J. D. Parkinson.

Report for week ending May 22 :—Total, 23 hrs. 40 mins. ; 17 hrs 10 mins. on QV, and 6 hrs. 30 mis. on LX.

Dual : 12 hrs. 15 mins. ; " A," 7 hrs. 25 mins. ; solo, 1 hr. 30 mins. ; joy rides with Mr. Parkinson, 2 hrs. 20 mins ; test, 10 mins.

The following members flew under instruction : Mrs. Heslop, Mr. Jewett, Mr. Heaton, Junr., Mr. Pargeter, Mr. Hayton, Mr. Shaw, Mr. Swann, Mr. Gibson.

Solo (training) : Mr. Bainbridge, Mr. Turnbull.

" A " Pilots : Mr. C. Thompson with Mr. Gibson and Mr. Campbell, Mr. H. Ellis with Mrs. White, Mr. Thirlwell, Mr. Carroll, Mr. Baxter Ellis with Mr. A. Bell, Mr. P. Forsyth Heppell, Mr. R. N. Thomspon with Mr. Percy.

Mr. Baxter Ellis flew in connection with local Empire Day celebrations.

Mr. R. N. Thompson and Mr. H. Ellis flew over the camp of the Tyne Electrical Engineers to assist with sound ranging practice.

Norfolk and Norwich Aero Club Notes

SIR JOHN RHODES landed on Sunday afternoon, 8th inst., and after a picnic on the aerodrome he took some petrol on board his " Moth " and left for Stag Lane.

Messrs. Boulton & Paul, Ltd., delivered a large new bombing machine to the order of the Air Ministry on Monday. The machine was flown away by the firm's pilot.

The Boulton & Paul P.9 machine, flown by Sqdn.-Leader Rea, represented the club at the Hamble air pageant, and is the first machine flown by a member of the club in a race. Unfortunately, although finishing first in the Wakefield Cup race, it was disqualified for cutting a corner.

The club house is at present being reconditioned and repainted so as to be ready for the official opening which it is expected will take place very shortly.

The club " Moth " is now almost ready, and is having the badge affixed. Delivery is expected next week.

The P.9 machine has been flown to Martlesham Heath every day this week with personnel of Messrs. Boulton and Paul's, on the firm's business.

Yorkshire Aeroplane Club

REPORT for week ending May 21 :—Total hours flown, 24 hrs. 45 mins. ; dual, 14 hrs. 10 mins. The following had dual instruction with Mr. Beck ; Miss Watson, Messrs. B. Dawson, Thomson, R. K. Max, Leethams, H., Batcock, D. D. Little, Ambler, Bramham, Oglesby, Miller, and Dr. Ling.

Solo : 10 hrs. 35 mins., by Messrs. Wood, R. K. Lax, Henry Leetham, L. S. Dawson, Clapham, Wayman and Mann.

On two days during the week flying was impracticable owing to high winds and fog.

Quite an orgy of first soloists occurred last Sunday, Messrs. R. K. Lax Batcock, D. D. Little and Henry Leetham being launched in great style. The last two may be considered as first soloists in that, although they have both made one solo flight previously, they have not been near an aeroplane for some six months.

On Tuesday we were honoured with a visit by Lord Ossulston and his " Moth." Mr. Loader with Mr. Stanhope Sprigg, of Imperial Airways, also Mr. Bell, Secretary of the Newcastle Club.

Mr. Beck has been amusing himself with the Blackburn " Bluebird," which was left here by Sqdn.-Leader Longton on his return from the Hampshire Club pageant. Sqdn.-Leader Longton took Messrs. Thornton and Ely, of the Blackburn Aeroplane Co., for short flights, after which Mr. Beck took Mr. Charles Blackburn up.

Capt. West again took a busman's holiday, and helped us out with joy rides and instruction.

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THE FIRST AERO FILLING STATION : The Anglo-American Oil Co., Ltd., have recently established a petrol filling station—the first in this country—at Brooklands, where aircraft, like the Henderson's Flying School Avro shown in our illustration, can fill up with " Pratts' " Spirit speedily and easily.

AIRISMS FROM THE FOUR WINDS

Service African Flight Concluded

THE splendid service flight across the African Continent has ended. On May 22 the four Fairey III F. (Napier "Lion") machines landed at Heliopolis Aerodrome in the afternoon, which they had left on March 30. This flight was also carried out for the purpose of co-operating with the South African Air Forces *en route*. It was commanded by Air-Commodore C. R. Samson, Chief Staff Officer in the Middle East, and with him were Squadron-Leader R. S. Maxwell, O.C. No. 47 Squadron, Helwan; Flight-Lieut. S. D. Macdonald; Flying-Officer D. L. G. Bett; Flight-Lieut. D. J. Blackford; two sergeant-fitters and one L.A.C. fitter. The full progress of the flight is as follows; left Heliopolis March 30, arrived Assuan same day; Khartoum, March 31; Malakal, April 2; Mongalla, April 3. The next day they reached Kisumu, and on the 5th the four South African D.H.9's arrived there. Co-operation manœuvres were carried out with every success at Nairobi, which the combined flights left on April 10 and arrived at Tabora, April 11, N'dola, April 13, and Pretoria, April 16. This completed the first part of the tour and the R.A.F. machines continued alone to Bloemfontein, arriving there on April 19. On April 21 they reached Capetown and thus completed the outward journey, 22 days after leaving Cairo. After five days' rest they went to Grahamstown on April 25, again co-operating with the Union machines. Returning via Pretoria again on May 9, Buluwayo, May 10, N'dola, May 13, Kisumu, May 15, Mongalla, May 17, Khartum, May 19, and Cairo, May 22. The pre-arranged schedule was kept faithfully, and no trouble worthy of comment was experienced during the whole flight. The aerodromes and landing places throughout the route were found to be in good order, and many roads in fair condition were found everywhere. On the return the airmen were accompanied by Captain Tasker, whom the South African Air Force lent to take the place of Flight-Lieut. Macdonald, the navigator, who fell ill at Pretoria and had to remain behind. The distance flown was 11,000 miles.

The Other Atlantic Attempts

The success of Capt. Lindbergh has naturally defeated part of the plans of his fellow competitors in America, and it is reported that Commander Byrd now prefers to fly from San Francisco to Honolulu or to make a reconnoitring flight over the Arctic from Alaska, but his backers have preferred that he should still make the Atlantic attempt, and he is expected to start immediately with a crew of four. On a test trip on May 23, he narrowly escaped disaster again when the right axle seized and nearly crashed the machine. The Bellanca aeroplane, which was to have been piloted by Messrs. Chamberlin and Bertaud, is stated to have been withdrawn. Certain differences amongst those interested in the attempt are supposed to have arisen to account for the abandonment, and law court suits are threatened.

Pinedo's Progress

THE Marquis de Pinedo left Montreal and reached Quebec on May 18. The next day he reached Shippegan Island, New Brunswick, and Trepassy Harbour at 8.33 p.m. on the 20th. On the 23rd he left there for the Azores and was sighted 360 miles north-west of Fayal of the Azores Islands at 4.30 p.m., by the steamship *London Importer*. After this nothing more was heard for some time, and as he did not arrive at the Azores when expected, some anxiety was felt. Subsequently, however, news was received to the effect that he had been forced to descend a hundred miles or so from his goal, and was being towed into Fayal Harbour by the Portuguese schooner *Infante de Sagres*. Pinedo was apparently uninjured.

Coste and Rignot to Try "and Get it Back."

THE two well-known French airmen, Capt. Coste and Lieut. Rignot, are attempting a long-distance record at once if weather conditions permit, flying between Paris and Tokyo in two stages. They will fly as far as possible on the first stage. Up till recently they held the record, which was 3,345·5 miles, made between Le Bourget and Jask on October 28-29, 1926.

Sarmento Beires not Returning Home by Air

THE Portuguese airmen Sarmento Beires and his two companions, who flew from Portugal to Brazil a short while back, will not, as originally intended, fly back, but will return home by steamer. The financial conditions of the Portuguese Government, it is stated, are responsible for this decision.

Southampton-Cherbourg at Last?

Now that the objections to the use of Cherbourg as an air port by the French authorities have been modified, there is a prospect of Imperial Airways linking Southampton with Cherbourg at last. The Cherbourg Chamber of Commerce have put forward a scheme for building a pontoon with a superstructure for passengers and mails, mooring it in the harbour at a predetermined point, and being constantly attended. But the air line is only in a tentative stage at present as regards the commercial side, for it is not considered that there is sufficient trade to warrant it yet, though there are reasonable prospects of express work connected with Atlantic steamers. A late fee mail service by air is favourably regarded, and it is proposed to see what support is likely to come from the postal authorities.

Flying Home from India

FLYING-OFFICER J. J. C. COCKS, R.A.F., who is flying from India to England on his own D.H.9 machine, left Karachi for Basra at 4·6 a.m., May 19. His machine was assembled from two machines that had been used in the war and which had been stored for several years.

Speeding up Canadian Mails

THE Canadian Postal authorities have asked the British Post Office to sort the mail in a manner which will enable it to be taken by aeroplane from the liners at Father Point, Quebec, and distributed swiftly in Quebec, Montreal, Ottawa, and Toronto. Arrangements for this air distribution are nearly completed, and a trial is expected to take place in September. A whole day will probably be saved in the service to Toronto and several hours for other cities.

New Norwegian Air Transport Company

THE Norwegian Air Route Company under the name of Norsk Luftfartsselskap, has just been formed at Oslo. The share capital is comparatively small, the intention being to co-operate with the German Hansa Company, which is starting the Oslo-Gothenburg-Copenhagen-Stettin route on June 15.

Australia's Beauty from the Air

PASSENGERS to Australia by the Orient Line will have an opportunity of seeing the beauty of South Australia from the air during the steamer's stay in Adelaide. Aeroplanes will attend the steamers in port.

Locating Reindeer from the Air

IN blinding snowstorms and a frozen atmosphere Lieut. Reistad, of the Norwegian Flying Corps, set out in an aeroplane to find a herd of 300 reindeer lost between the File Mountains and the western coast. With him were a mechanic and the herdsmen. His machine was fitted with skis instead of wheels. The reindeer are worth 40,000 kronen.

Aerial Ban on Oxford Undergrads

UNDERGRADUATES at Oxford hae been banned from making aeroplane flights.

The Sassoon Cup.

A R.A.F. RACE of great interest is that which takes place at Northolt Aerodrome to-day at 2.30 p.m., between single-seater fighters from nine different squadrons for a Cup presented by Sir Philip Sassoon. The heats for this race have been flown at the stations of the various squadrons, and to-day's race at Northolt is the final. The course is Northolt-Duxford-Halton-Northolt, and has to be covered once. The machines will fly at 2,000 feet, and pilots are permitted to remove bomb racks and other excrescences by way of "cleaning up" their machines. The squadrons represented are: No. 3, Upavon, Hawker "Woodcock," F/O B. Cranswick, M.C.; No. 17, Upavon, Hawker "Woodcock," Fl.Lt. F. L. Pearce; No. 19, Duxford, Gloster, "Grebe," F/O P. P. Grey; No. 23, Henlow, Gloster "Gamecock" F/O A. W. B. McDonald; No. 25, Hawkinge, Gloster "Grebe," F/O L. E. Maynard; No. 29, Duxford, Gloster "Grebe," F/O W. A. Tattersall; No. 32, Kenley Gloster "Gamecock, P/O A. H. Montgomery; No. 41, Northolt, Siddeley "Siskin," P/O H. T. Andrews; No. 43, Tangmere, Gloster "Gamecock," Fl.Lt. A. C. Collier.

The winning machine will fly in the R.A.F. Pagent.

FLIGHT
AIRCRAFT ENGINEER AIRSHIPS

THE ROYAL AIR FORCE

London Gazette, May 17, 1927

General Duties Branch

Group Captain J. A. Chamier, C.B., C.M.G., D.S.O., O.B.E., is appointed Deputy Director of Technical Development, Air Ministry (vice Group Captain Henry Meyrick Cave-Browne-Cave, D.S.O., D.F.C.) (May 6). The follg. Pilot Officers are promoted to rank of Flying Officer :—K. Garston-Jones (March 28) ; A. W. Shaw (April 12).

The follg. officers are transferred to Reserve :—Class A : Flying Officer M. H. Aten, D.F.C. (May 18). Class C :—Flying Officer F. W. Healey (May 19).

Pilot Officer J. M. Hunter resigns his short service commn. (May 17) ; Flying Officer J. R. Bowring, M.C. (Lt., Royal Artillery), relinquishes his temp. commn. on return to Army duty (May 14) ; Flying Officer H. S. Hobby, M.C. (Lt., East Yorks Regt.), relinquishes his temp. commn. on return to Army duty (May 8) ; Flying Officer A. H. D. Livock relinquishes his short service commn. on account of ill-health (May 20). The short service commn. of the follg. Pilot Officers on probation are terminated on cessation of duty :—C. E. N. Turton (May 13) ; G. A. Robinson (May 18).

Accountant Branch

Sqdn.-Ldr. H. E. Rowley relinquishes his Commn. on account of ill-health (Nov. 12, 1924). (Substituted for *Gazette* Nov. 11, 1924.)

Medical Branch

Sqdn.-Ldr. R. S. Topham, M.B., D.P.H., D.M.R.E., is placed on reitred list at his own request (May 1). (Substituted for *Gazette* May 3). Flt.-Lieut. H. H. R. Bayley relinquishes his temp. commn. on completion of service (April 27).

Reserve of Air Force Officers

The follg. are granted commissions in General Duties Branch as Pilot Officers on probation :—Class A : E. E. Fresson (May 17). Class A.A. : E. N. Parker (May 2).

The follg. Flying Officers are transferred from Class A to Class C :—B. H. Shaw (Oct. 10, 1926) ; H. S. Eaton (Oct. 18, 1926). The follg. Flying Officers relinquish their commns. on completion of service :—G. V. Yorke (Feb. 26) H. J. Mitchell (May 4) ; G. H. Wenn (May 13).

AUXILIARY AIR FORCE

General Duties Branch

The follg. to be Pilot Officer :—No. 605 County of Warwick (Bombing) Squadron.—C. R. Field (May 17).

Erratum.—(See FLIGHT, May 5, 1927, p. 283) :—The Naval rank of Lieut. C. A. Kingsley-Rowe and J. C. Richards is as now described, and not as stated in *Gazette*, April 26.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified :—

General Duties Branch

Flight Lieutenants : R. L. Stevenson, M.B.E., to No. 22 Group, H.Q., Farnborough, 6.5.27. J. W. Young, M.B.E., to No. 20 Sqdn., India, 5.4.27. J. R. Wolley, to No. 1 Wing H.Q., India, 5.4.27. B. H. C. Russell, to No. 3 Wing, H.Q., India, 1.4.27. P. J. Clayson, M.C., D.F.C., to No. 6 Sqdn., Iraq, 1.4.27. F. Beaumont, to H.Q., Iraq, 20.4.27. E. L. P. Morgan, C. F. Horsley, M.C., G. G. Banting, R. L. Crofton, M.B.E., A.F.C., C. D. Pyne, and H. W. Clayton, to R.A.F. Depot, Uxbridge, 9.4.27. E. S. Goodwin, A.F.C., to R.A.F. Depot, Uxbridge, 11.4.27. F. H. E. Reeve, to Elec. and Wireless Sch., Flowerdown, 11.5.27. J. MacG. Fairweather, D.F.C., to No. 23 Sqdn., Kenley, 18.5.27. A. J. E. Broomfield, D.F.C., to No. 4 Sqdn., S. Farnborough, 16.5.27.

Flying Officers : H. J. Gearing, to H.Q., Egypt, 19.4.27. P. R. Stroud, to No. 4 Flying Training Sch., Egypt, 10.4.27. J. H. Powle to No. 60 Sqdn., India, 7.4.27. N. K. Howard and G. B. Collet, to No. 5 Sqdn., India, 7.4.27. R. D. Adams, to No. 27 Sqdn., India, 7.4.27. H. R. Bardon, to No. 60 Sqdn., India, 29.4.27. G. P. Chamberlain, to H.Q., India, 14.4.27. J. A. Hawkings, to No. 60 Sqdn., India, 10.4.27. T. K. Merrett, to No. 31 Sqdn., India, 7.4.27. W. E. James, to No. 4 Stores Depot, Ickenham 12.4.27. B. Cheesman, M.B.E., to Marine Aircraft Experimental Estab., Felixstowe, 9.4.27. H. L. Beatty, to No. 481 Flight, Mediterranean, 20.4.27. (Hon. Flight-Lieut.) G. Anderson, to H.Q., Iraq, 22.4.27. M. C. Pascoe, to No. 481, Flight, Mediterranean, 20.4.27. R. Scott-Taylor, to H.Q., Iraq, 20.4.27. J. A. T. Ryde, to No. 402 Flight, Mediterranean, 20.4.27. F. Porter, to No. 84 Squadron, Iraq, 1.4.27. A. P. Marchant, M.B.E., D.S.M., to Armoured Car Wing, Iraq, 1.4.27. K. C. Garvie, to Aircraft Depot, Iraq, 1.4.27. C. Dollery, M.B.E., to H.Q., Fighting Area, Uxbridge, 16.5.27. (Hon. Flight-Lieut.) W. F. R. Gough, to R.A.F. Base, Calshot, 13.5.27. J. E. Doran-Webb, to No. 17 Sqdn., Upavon, 23.5.27. S. E. Bulloch, to Record Office, Ruislip, 13.5.27. H. Buxton, T. H. Moon, D. Macfadyen, and A. W. Crees, to R.A.F. Depot, Uxbridge, 9.4.27.

Accountant Branch

Squadron Leaders : P. J. Wiseman, to No. 4 Stores Depot, Ickenham, 9.5.27. H. F. Fuller, to R.A.F. Depot, Egypt, 20.4.27.

Squadron-Leader A. R. Thomas, to R.A.F. Depot, Uxbridge ; 8.4.27.

Flight Lieutenants : W. E. Ennis, to R.A.F. Depot, Uxbridge, 9.4.27. (Hon. Sqdn. Ldr.) G. H. White, to R.A.F. Depot, Uxbridge, 22.4.27. J. Sullivan, to R.A.F. Depot, Uxbridge, 9.4.27.

Flight-Lieutenants : E. V. Humphrey, to No. 216 Sqdn., Egypt ; 22.4.27. W. E. Ennis, to Record Office, Ruislip ; 12.5.27.

Flying Officers : D. F. A Clarke, to No. 208 Sqdn., Egypt, 14.4.27. A. E. West, to H.Q., Egypt, 20.4.27. C. W. Price, to R.A.F. Depot, Uxbridge, 9.4.27. M. H. Luker, to No. 100 Sqdn., Spittlegate : 26.5.27.

Medical Branch

Squadron-Leader F. E. Johnson, to Heliopolis Details ; 29.4.27.

Flight Lieutenants : G. J. Griffiths, to R.A.F. British Hospital, Iraq, 29.3.27. T. W. Wilson, to Station Commandant, Hinaidi, Iraq, 1.4.27. D. B. Smith, M.B., to R.A.F. Combined Hospital, Iraq, 1.4.27.

Flight-Lieutenants : J. Perry-Evans, to No. 208 Sqdn., Egypt ; 20.4.27. F. L. White, to No. 2 Armoured Car Coy., Palestine ; 23.4.27. L. C. Palmer-Jones, M.B., to No. 4 Flying Training Sch., Egypt ; 23.4.27.

Flight Lieutenant (Dental) P. P. Hogan, to R.A.F. General Hospital, Iraq, 1.4.27.

Flying Officers : B. L. Edwards, M.B., to R.A.F. Combined Hospital, Iraq, 1.4.27. R. Thorpe, to No. 4 Sqdn., S. Farnborough ; 7.5.27.

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R.A.F. Middle East Reunion Dinner

AIR VICE-MARSHAL SIR W. S. BRANCKER, K.C.B., A.F.C., will preside at the Sixth Annual R.A.F. Middle East dinner at the Trocadero, Shaftesbury Avenue, W. 1., on Thursday, June 2, at 7.30 (for 8) p.m. As in past years, the dinner is a re-union for those who served as officers with the R.N.A.S., R.F.C., or R.A.F. during the war in Palestine, Mesopotamia, Salonica, Mediterranean, Egypt, East Africa, India or Aden. Applications for tickets (12*s.* 6*d.* which includes "tips" but excludes wines) must be made not later than Friday, May 27. Cheque or P.O., crossed "Westminster Bank, M.E. Dinner a/c," must accompany all applications, which should be addressed to Brig.-General W. B. Caddell, Vickers House, Broadway, Westminster, S.W. 1.

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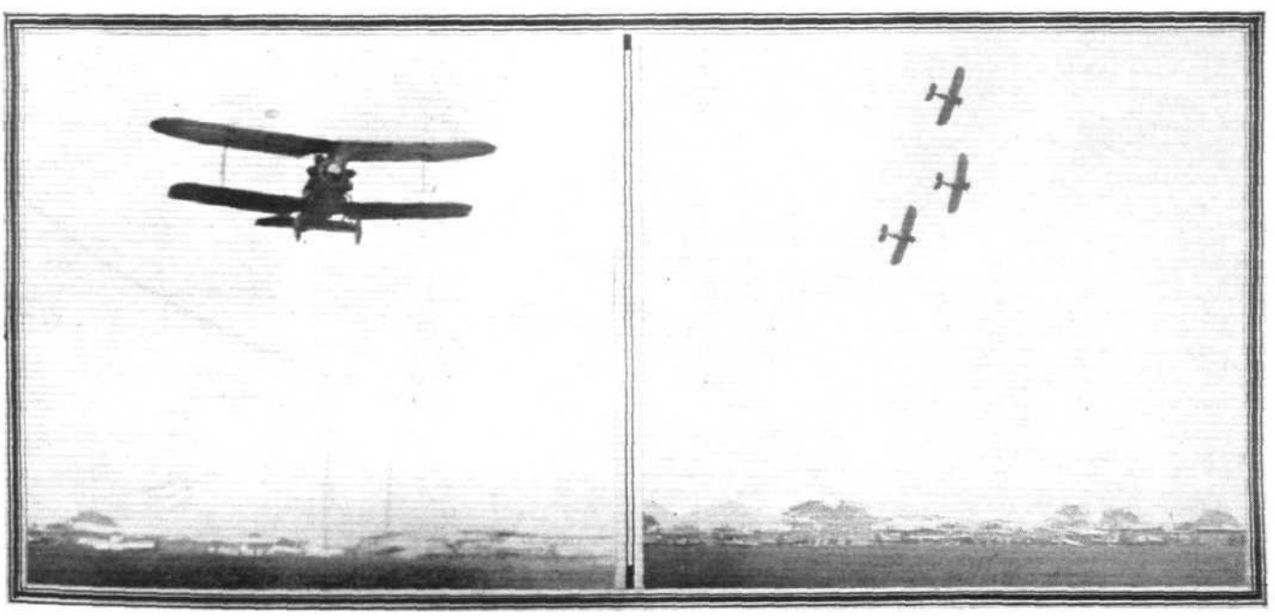
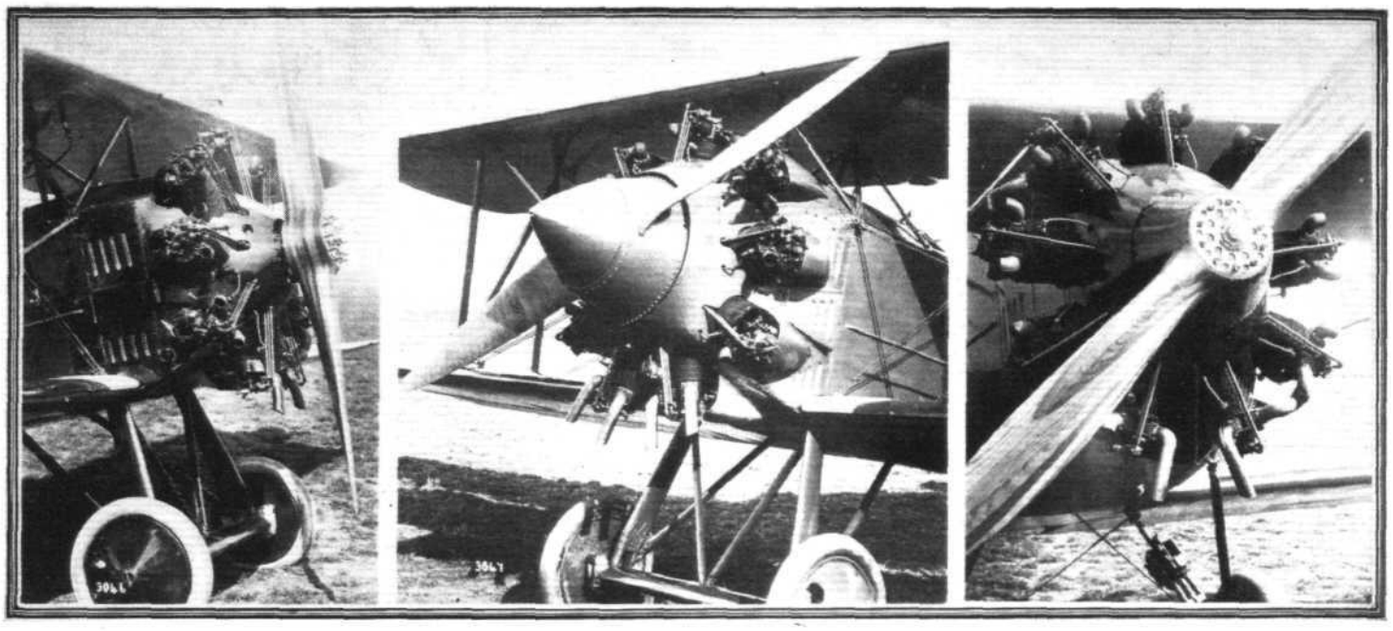


["FLIGHT" *Photographs*

SEEN AT THE HAMPSHIRE AIR PAGEANT : Two Service Events ; (left), Flight-Lieut. H. C. Calvey gives a demonstration of Eccentric flying ; and (right), Flight-Lieut. C. R. Smythe, F./O. C. W. Byas, and Sergt.-Pilot E. H. Wells, give some fine Stunting in Formation on Gloster "Gamecocks."



BRISTOL "JUPITERS" IN CZECHOSLOVAKIA: This successful air-cooled radial engine has found favour in several foreign countries, and our illustrations show the "Jupiter" installed in three Czecho-Slovakian machines Left, the Avia B.H. 21 single-seater fighter; centre, the Avia B.H. 33 high-altitude single-seater fighter (Series VI engine); and, right, the Avia B.H. 26 two-seater fighter.

IN PARLIAMENT

Airships

Rear-Admiral Beamish, on May 17, asked the Secretary of State for Air whether the R100 can be rehoused at Howden without first being trimmed and ballasted at a mooring mast at that station; and what is the estimated cost of a mooring mast?

Sir Samuel Hoare: There is some misapprehension; the trim of an airship riding at a mast is different from that required for her housing in a shed, and consequently she has to be retrimmed for this purpose after she has left the mast. The cost of a mooring tower is approximately £51,000, if similar to that erected at Cardington, or £44,000 if certain features are omitted.

Rear-Admiral Beamish asked what arrangements were proposed for rehousing the R100 if no mooring mast is available at Howden, since R101 will be in the Cardington shed; and can R101, when completed, be housed at Howden?

Sir S. Hoare: It is proposed to construct a second shed at Cardington, and this shed will be available for rehousing R100 during her trials, which will be carried out from the Cardington mast. The height of R101 will not permit of her being housed at Howden.

The cost of the new shed (included in the Estimate for this year) is something over £100,000.

Cairo-Karachi Air Route and Persia

Lieut.-Comdr. Kenworthy, on May 18, asked the Secretary of State for Foreign Affairs whether permission is still being refused to British aeroplanes to fly over Persian territory on the Cairo-Karachi air route; if, so, what steps are being taken to remove the difficulties; and if he will state the reasons put forward by the Persian Government for the prohibition?

Mr. Locker-Lampson: No reason has been given by the Persian Government for their recent decision not to open a route along the southern coast of Persia to international air traffic. They have, however, stated that, should the Persian Parliament eventually approve the International Air Convention of 1919, to which the Persian Government acceded in 1920, they will be prepared to fix another line for international traffic, but that, in that event, the internal situation and frontier considerations will lead them to choose a line across Central Persia. I have no further statement to make regarding the present negotiations on the subject with the Persian Government.

Airships

Mr. Viant asked the Secretary of State for Air (1) if he can give the factor of safety aimed at in the new airships, in view of the fact that two experts are now examining the designs and factors of safety of the two airships; and have the constructors of the R 100 been apprised of this examination, with a view to delaying the construction until the experts' Report is issued;

(2) if he is satisfied that the strength of the airship R 100 has, in fact, been doubled; when the change in design took place and was it notified to, and confirmed by, the Air Ministry or any other authoritative panel or committee; and, as the design of this airship is settled and the ship is now under construction, can he state the increase of weight in the structure of the ship consequent upon the reported increase in the strength?

Sir S. Hoare: R 100 (as also the Government airship R 101) has to conform to the general principles of airworthiness (including certain factors of safety) which were laid down in October, 1924, by the Airworthiness of Airships Panel of the Aeronautical Research Committee, whose Report is on sale as No. 970 of the series of Reports and Memoranda issued by that Committee. The two distinguished scientists, to whom I referred in my reply on May 4, were appointed to examine the actual designs of both airships, and determine their airworthiness in accordance with the Panel's Report. The Airship Guarantee Company were informed in July, 1926, of the appointment of these gentlemen as the Airworthiness Authority for the two airships, and have since been in direct communication with them. I am aware that the Airship Guarantee Company have considered the question of embodying additional factors of safety and their suggestions have been communicated to the Airworthiness Authority, but I do not think I can properly make any more detailed statement on the strength of R 100 at the present time, when the Authority's examination of the design is still in progress.

PUBLICATIONS RECEIVED

Eagle VIII and Falcon III Aero Engines. Air Publication 859. *3rd Edition, November*, 1926. H.M. Stationery Office, Kingsway, London, W.C.2. Price 1s. net.

International Disarmament as Related to the Development of Civil Aviation. Report of the Committee of Experts on Civil Aviation to the Preparatory Commission for the Disarmament Conference. Reprinted by The Daniel Guggenheim Fund for the Promotion of Aeronautics, Inc., New York, N.Y., U.S.A.

* * * *

NEW COMPANY REGISTERED

GNAT AERO COMPANY, LTD., Shoreham Aerodrome, Shoreham-by-Sea, Sussex.—Capital £1,500, in £1 shares. Acquiring business of aerodrome proprietors now carried on by F. Geo. Miles and C. L. Pashley at Shoreham, Sussex, as the "Gnat Aero Co.," aeroplane manufacturers and repairers, carriers of passengers, etc. First directors: F. Geo. Miles (managing director), C. L. Pashley and F. Gaston Miles.

* * * *

AERONAUTICAL PATENT SPECIFICATIONS

(*Abbreviations*: Cyl. = cylinder; i.c. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

APPLIED FOR IN 1926

Published May 26, 1927

3,125. S. G. Brown. Gyroscopic directional instruments. (270,006.)
3,950. C. R. Fairey and M. Lobelle. Framed structures, such as fuselages of aeroplanes. (270,022.)
9,781. A. R. Thornblad. Parachutes. (250,945.)
17,961. Goodyear Zeppelin Corporation. Airships. (255,489.)
18,756. R. Esnault-Pelterie. Tents. (256,242.)

APPLIED FOR IN 1927

Published May 26, 1927

601. M. A. Klauck. Struts, tie-rods, etc. (270,204.)

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